

August
2020



Draft

Environmental Assessment

Addressing the Proposed Improvement, Maintenance, and
Repair of 1418 Firebreak Road in the Chula Vista Station
Area of Responsibility of the U.S. Border Patrol, San
Diego Sector, California



**U.S. Customs and
Border Protection**

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ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council on Historic Preservation	DNL	Day-Night Level
AIRFA	American Indian Religious Freedom Act	DOD	U.S. Department of Defense
AMSL	above mean sea level	EA	Environmental Assessment
AOR	Area of Responsibility	EIA	U.S. Energy Information Administration
AQCR	air quality control region	EIS	Environmental Impact Statement
ARHA	Archaeological and Historic Preservation Act	E.O.	Executive Order
BLM	Bureau of Land Management	ESA	Endangered Species Act
BMP	Best Management Practice	FC	Functional Classification
B.P.	Before Present	FEMA	Federal Emergency Management Agency
CAA	Clean Air Act	FIRM	Flood Insurance Rate Map
Cal/EPA	California Environmental Protection Agency	FONSI	Finding of No Significant Impact
CBP	U.S. Customs and Border Protection	FPPA	Farmland Protection Policy Act
CCR	California Code of Regulations	ft	feet
CDFW	California Department of Fish and Wildlife	FY	Fiscal year
CDWR	California Department of Water Resources	GHG	Greenhouse gas
CEQ	Council on Environmental Quality	HAP	hazardous air pollutant
CEQA	California Environmental Quality Act	MBTA	Migratory Bird Treaty Act
CFR	Code of Federal Regulations	MSCP	Multiple Species Conservation Program
CGS	California Geological Survey	NAAQS	National Ambient Air Quality Standards
CHU	Chula Vista Station	NAGPRA	Native American Graves Protection and Repatriation Act
CNDDDB	California Natural Diversity Database	NEPA	National Environmental Policy Act
CNPS	California Native Plant Society	NHPA	National Historic Preservation Act
CO	Carbon dioxide	NO _x	Total nitrogen oxides
CWA	Clean Water Act	NO ₂	Nitrogen dioxide
CRHR	California Register of Historical Resources	NOAA	National Oceanic and Atmospheric Administration
dB	decibel	NPDES	National Pollutant Discharge Elimination System
dba	A-weighted decibel	NRCS	Natural Resources Conservation Service
DHS	Department of Homeland Security		

NRHP	National Register of Historic Places	SDNHM	San Diego Natural History Museum
NVCS	National Vegetation Classification System	SHPO	State Historic Preservation Officer
NWR	National Wildlife Refuge	SIP	State Implementation Plan
O ₃	ozone	SO _x	Sulfur oxides
OHWM	ordinary high water mark	TCR	tribal cultural resources
OMER	Otay Mountain Ecological Reserve	typ	tons per year
		µg/m ³	micrograms per cubic meter
POE	Port of Entry	USACE	U.S. Army Corps of Engineers
PRC	Public Resources Code	USBP	U.S. Border Patrol
PSD	Prevention of Significant Deterioration	U.S.C.	United States Code
RWQCB	Regional Water Quality Control Board	USEPA	U.S. Environmental Protection Agency
SDAPCD	San Diego Air Pollution Control District	USFWS	U.S. Fish and Wildlife Service
		USNVC	United States National Vegetation Classification
SDC	San Diego Sector	USGS	U.S. Geological Survey
SDIAQCR	San Diego Intrastate AQCR	VOC	volatile organic compound
SDMMP	San Diego Management & Monitoring Program		

Cover Sheet

Draft Environmental Assessment Addressing the Proposed Improvement, Maintenance, and Repair of 1418 Firebreak Road in the Chula Vista Station Area of Responsibility of the U.S. Border Patrol, San Diego Sector, California

Responsible Agencies: Department of Homeland Security (DHS), U.S. Customs and Border Protection (CBP), U.S. Border Patrol (USBP).

Affected Location: Proctor Valley, San Diego County, California.

Report Designation: Draft Environmental Assessment (EA) addressing the Proposed Improvement, Maintenance, and Repair of 1418 Firebreak Road.

Abstract: The Department of Homeland Security and CBP propose to improve, maintain, and repair 1418 Firebreak Road in the Chula Vista Station (CHU) Area of Responsibility (AOR) of the USBP San Diego Sector (SDC) to support USBP operations. The objective of this project would be to improve the Firebreak Road to a Functional Classification 2 (FC-2) level, all-weather roadway.

The EA presents the analysis and documents potential environmental consequences associated with the Proposed Action. If the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental or socioeconomic impacts, then a Finding of No Significant Impact (FONSI) would be prepared. If potential environmental concerns arise that cannot be mitigated to a level of insignificance, a Notice of Intent to prepare an Environmental Impact Statement (EIS) would be required.

Status updates for the EA can be obtained via the CBP EA website at <http://www.cbp.gov/about/environmental-cultural-stewardship/cbp-environmental-documents> or by emailing John.P.Petrilla@cbp.dhs.gov. Comments on the EA or information requests can be submitted to 1418 Firebreak Road EA c/o Mr. John Petrilla, Border Patrol and Air & Marine Program Management Office, 24000 Avila Road, Suite 5020, Laguna Niguel, California 92677; or by email at John.P.Petrilla@cbp.dhs.gov.

Privacy Advisory

Comments on this document are requested. Letters or other written comments provided could be published in the EA. Comments will typically be addressed in the EA and made available to the public. Any personal information provided will be used only to identify a desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the private citizens making comments will be disclosed; personal home addresses and telephone numbers will not be published in the EA.

DRAFT

**ENVIRONMENTAL ASSESSMENT
ADDRESSING THE
PROPOSED IMPROVEMENT, MAINTENANCE, AND
REPAIR OF 1418 FIREBREAK ROAD IN THE CHULA
VISTA STATION AREA OF RESPONSIBILITY OF THE
U.S. BORDER PATROL,
SAN DIEGO SECTOR, CALIFORNIA**

**DEPARTMENT OF HOMELAND SECURITY
U.S. CUSTOMS AND BORDER PROTECTION
U.S. BORDER PATROL**

AUGUST 2020

TABLE OF CONTENTS

1	INTRODUCTION.....	1-1
1.1	BACKGROUND.....	1-1
1.2	LOCATION.....	1-2
1.3	PURPOSE OF AND NEED FOR THE PROPOSED ACTION.....	1-2
1.4	PUBLIC INVOLVEMENT.....	1-5
1.5	FRAMEWORK FOR ANALYSIS	1-6
2	PROPOSED ACTION AND ALTERNATIVES	2-1
2.1	INTRODUCTION.....	2-1
2.2	SCREENING CRITERIA FOR ALTERNATIVES	2-1
2.3	ALTERNATIVE 1: PARTIAL ROAD IMPROVEMENT (PROPOSED ACTION).....	2-1
2.4	ALTERNATIVE 2: COMPLETE ROAD IMPROVEMENT	2-3
2.5	ALTERNATIVE 3: IMPROVE DRAINAGE FEATURES WITHOUT WIDENING ROAD	2-4
2.6	NO ACTION ALTERNATIVE	2-4
2.7	COMPARISON OF ALTERNATIVES.....	2-4
3	AFFECTED ENVIRONMENT	3-1
3.1	PRELIMINARY IMPACT SCOPING	3-1
3.1.1	Socioeconomic Resources, Environmental Justice, and Protection of Children	3-2
3.1.2	Roadways and Traffic	3-2
3.1.3	Hazardous Materials and Waste Management.....	3-2
3.1.4	Aesthetic and Visual Resources.....	3-2
3.1.5	Health and Human Safety	3-2
3.2	LAND USE	3-3
3.2.1	Definition of the Resource	3-3
3.2.2	Affected Environment.....	3-4
3.2.3	Environmental Consequences	3-7
3.3	GEOLOGY AND SOILS	3-7
3.3.1	Definition of the Resource	3-7
3.3.2	Affected Environment.....	3-8
3.3.3	Environmental Consequences	3-10
3.4	VEGETATION	3-13
3.4.1	Definition of the Resource	3-13
3.4.2	Affected Environment.....	3-14
3.4.3	Environmental Consequences	3-18
3.5	TERRESTRIAL AND AQUATIC WILDLIFE RESOURCES.....	3-20
3.5.1	Definition of the Resource	3-20
3.5.2	Affected Environment.....	3-20
3.5.3	Environmental Consequences	3-21
3.6	THREATENED AND ENDANGERED SPECIES	3-23
3.6.1	Definition of the Resource	3-23
3.6.2	Affected Environment.....	3-23

3.6.3	Environmental Consequences	3-30
3.7	HYDROLOGY AND GROUNDWATER	3-34
3.7.1	Definition of the Resource	3-34
3.7.2	Affected Environment.....	3-34
3.7.3	Environmental Consequences	3-35
3.8	SURFACE WATERS AND WATERS OF THE UNITED STATES	3-37
3.8.1	Definition of the Resource	3-37
3.8.2	Affected Environment.....	3-39
3.8.3	Environmental Consequences	3-41
3.9	FLOODPLAINS	3-42
3.9.1	Definition of the Resource	3-42
3.9.2	Affected Environment.....	3-42
3.9.3	Environmental Consequences	3-43
3.10	AIR QUALITY	3-44
3.10.1	Definition of the Resource	3-44
3.10.2	Affected Environment.....	3-45
3.10.3	Environmental Consequences	3-45
3.11	NOISE	3-50
3.11.1	Definition of the Resource	3-50
3.11.2	Affected Environment.....	3-52
3.11.3	Environmental Consequences	3-52
3.12	CULTURAL RESOURCES	3-55
3.12.1	Definition of the Resource	3-55
3.12.2	Affected Environment.....	3-56
3.12.3	Environmental Consequences	3-59
3.13	RECREATION AND ACCESS	3-60
3.13.1	Definition of the Resource	3-60
3.13.2	Affected Environment.....	3-61
3.13.3	Environmental Consequences	3-61
4	CUMULATIVE AND OTHER IMPACTS	4-1
4.1	PAST, PRESENT, AND REASONABLY FORSEEABLE FUTURE ACTIONS	4-1
4.2	CUMULATIVE ANALYSIS BY RESOURCE AREA	4-3
4.2.1	Alternative 1: Proposed Action.....	4-3
4.2.2	Land Use	4-4
4.2.3	Geology and Soils	4-4
4.2.4	Vegetation	4-4
4.2.5	Terrestrial Wildlife Resources	4-4
4.2.6	Threatened and Endangered Species	4-5
4.2.7	Hydrology and Groundwater	4-5
4.2.8	Surface Waters and Waters of the United States	4-5
4.2.9	Floodplains.....	4-6
4.2.10	Air Quality	4-6
4.2.11	Noise	4-6
4.2.12	Cultural Resources	4-7
4.2.13	Recreation and Access	4-7

4.2.14 No Action Alternative..... 4-7

5 REFERENCES..... 5-1

6 LIST OF PREPARERS..... 6-1

FIGURES & PHOTOGRAPHS

Figure 1-1. General Location Map.....	1-3
Figure 1-2. Project Location	1-4
Photograph 1-1. Vehicle traversing poor road conditions	1-5
Photograph 1-2. Erosion on existing roadbed.....	1-5
Figure 2-1. Project Alternatives	2-5
Figure 2-2. Example Water Bar Design and Construction (Keller and Sherar 2003).....	2-6
Figure 2-3. Water Bar Perspective View	2-6
Photograph 2-1. Example Water Bar Location.....	2-7
Photograph 2-2. Example Water Cutout Location.....	2-7
Figure 3-1. Critical Habitat	3-25
Figure 3-2. Water Features within the Proposed Project Area.....	3-40

TABLES

Table 1-1. Key Permits and Approvals (as applicable) and Interagency Coordination.....	1-7
Table 2-1. Comparison of Features of Each Alternative.....	2-8
Table 2-2. Comparison of Purpose and Need with Alternatives Summary	2-9
Table 3-1. Land Ownership within the Project Area	3-5
Table 3-2. Major Faults within the Vicinity of 1418 Firebreak Road	3-9
Table 3-3. Vegetation Communities Occurring in the Project Area.....	3-16
Table 3-4. Approximate Surface Area to be Graded During Maintenance and Repair Activities.....	3-47
Table 3-5. Estimated Air Emissions from Alternative 1	3-48
Table 3-6. Estimated Air Emissions from Alternative 2.....	3-50
Table 3-7. Estimated Air Emissions from Alternative 3.....	3-51
Table 3-8. Common Sounds and Their Levels	3-51
Table 3-9. Predicted Noise Levels for Typical Construction Equipment	3-53

APPENDICES

Appendix A: Road Classifications and Maintenance and Repair Standards
Appendix B: Public Involvement Materials
Appendix C: Applicable Laws, Regulations, and Executive Orders
Appendix D: Water Bar and Water Cutout Location Photographs
Appendix E: Soil Maps
Appendix F: Vegetative Community Maps
Appendix G: Best Management Practices and Mitigation Measures
Appendix H: Air Quality Emissions Calculations

1 INTRODUCTION

U.S. Customs and Border Protection (CBP) proposes to improve, maintain, and repair 1418 Firebreak Road in the Chula Vista Station (CHU) Area of Responsibility (AOR) of the U.S. Border Patrol (USBP) San Diego Sector (SDC), California, to support USBP operations. The objective of this project would be to improve the Firebreak Road from a Functional Classification 4 (FC-4) two-track road to a FC-2 all-weather roadway.

An Environmental Assessment (EA) is being prepared to describe and assess the potential environmental and socioeconomic impacts of the Proposed Action. The EA complies with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] Section 4321–4347); the Council on Environmental Quality’s (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] Parts 1500–1508); and Department of Homeland Security’s Instructional Manual 023-01-001-01, Rev. 01, *Implementing the National Environmental Policy Act*. In addition, the EA also meets the requirements of the California Environmental Quality Act (CEQA).

This EA is organized into six sections plus appendices. **Section 1** provides background information on the existing 1418 Firebreak Road, identifies the purpose of and need for the Proposed Action, describes the area in which the Proposed Action would occur, and explains the public involvement process. **Section 2** provides a detailed description of the Proposed Action and alternatives, including the No Action Alternative. **Section 3** describes existing environmental conditions in the area where the Proposed Action would occur and identifies potential environmental impacts that could occur within each resource area. **Section 4** contains an analysis of the cumulative and other impacts that the Proposed Action, combined with other projects in the area, could have on the environment. **Sections 5** and **6** provide a list of references used to develop the EA, and a list of preparers who developed the EA, respectively. Finally, the appendices include other information pertinent to the development of the EA.

1.1 BACKGROUND

The mission of the USBP is to detect and prevent cross-border violators, terrorists, and terrorist weapons from entering the United States, and prevent illegal trafficking of people and contraband. In many areas, tactical infrastructure, of which roads are considered an important component, is a critical element of border security, and contributes as a force multiplier for controlling and preventing illegal border intrusion. To achieve effective control of our nation’s borders, CBP uses a multi-prong approach including a combination of personnel, technology, and infrastructure; the mobilization and rapid deployment of people and resources; and the fostering of partnerships with other law enforcement agencies. CBP must ensure that tactical infrastructure functions as intended, which includes facilitation of meeting the following mission requirements:

- Establishing substantial probability of apprehending terrorists and their weapons as they attempt to illegally enter between the Ports of Entry (POEs)
- Deterring illegal entries through improved enforcement

- Detecting, apprehending, and deterring smugglers of humans, drugs, and other contraband.

Furthermore, well-maintained tactical infrastructure allows ready access to the U.S./Mexico international border and environs for rapid response to detected threats and facilitates the ability to adjust quickly to changing threats.

1.2 LOCATION

The project is in Proctor Valley, San Diego County, California (see **Figure 1-1**). The valley is situated north of Otay Mountain and east of Lower Otay Lake. 1418 Firebreak Road connects to a larger dirt road south of a gated junction with Otay Lakes Road. There are four landowners along the road's route, including Bureau of Land Management (BLM), United States Fish and Wildlife Service (USFWS), City of Chula Vista (which is managed by the County of San Diego) and the California Department of Fish and Wildlife (CDFW). The Proposed Action's staging area and the access road from Otay Lakes Road is on a CDFW-managed Ecological Reserve. The western portion of 1418 Firebreak Road is on a CDFW/USFWS National Wildlife Refuge (NWR). A major portion of the road is on BLM land designated as the Otay Mountain Wilderness. The southern end of the road is owned by the City of Chula Vista and managed by the County of San Diego (see **Figure 1-2**). The road is gated and motorized access by the public is prohibited. The majority, if not all, of motorized traffic on the road is USBP traffic.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to ensure that the physical integrity of the existing road and associated supporting elements continue to perform as intended to assist the USBP in securing the U.S./Mexico international border in California. The improvement of the road would enhance agent safety and effectiveness by providing efficient, reliable, and safe routes to remote areas that require patrolling. The road is critical to SDC's ability to maintain easy access to otherwise inaccessible portions of the border region by linking Otay Lakes Road to Otay Mountain, an area with high rates of apprehension of cross border violators. The road also provides a high point for visibility for USBP agents. The current FC-4 two-track road is composed of unimproved road, wagon trail, and 4-wheel drive road (see **Photograph 1-1**). As "two-track" implies, the road consists of two parallel tracks created by the loss of vegetation where the tires make contact with and compact the earth, between which lies a strip of low-growth vegetation (see **Appendix A**). In many areas, the central vegetated strip has succumbed to erosion (see **Photograph 1-2**). The road has received very little maintenance, although there is evidence of infrequent surface blading activity. The road has no crown and does not have any improved drainage features or ditches. The proposed activities would ensure that the road is passable, providing faster response time to border incidents in strategically valuable areas.

The need for the Proposed Action is to ensure that the increased level of border security provided by access along 1418 Firebreak Road is not compromised by natural events or breaches in road integrity. CBP must ensure that tactical infrastructure functions as it is intended.

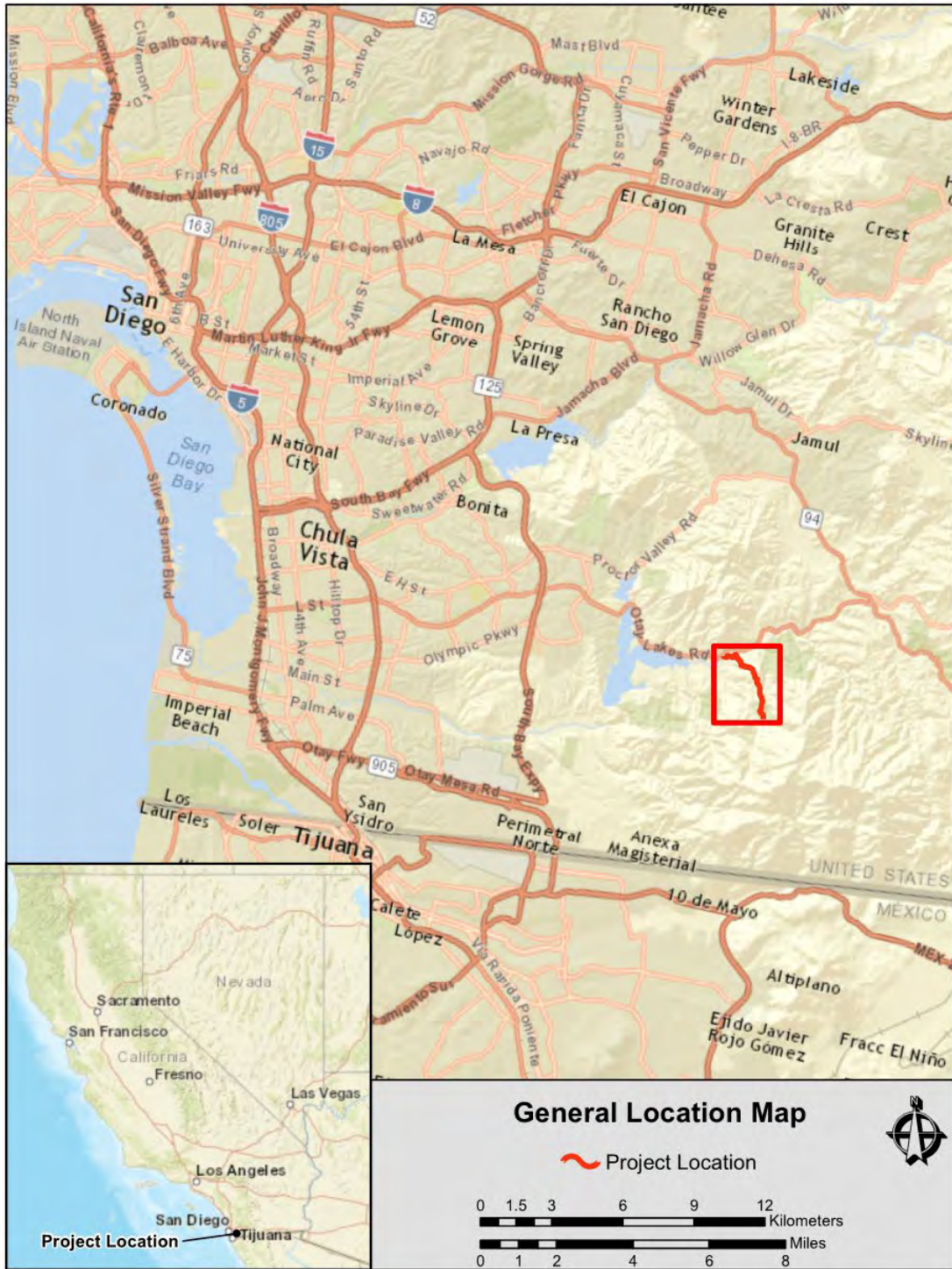


Figure 1-1. General Location Map

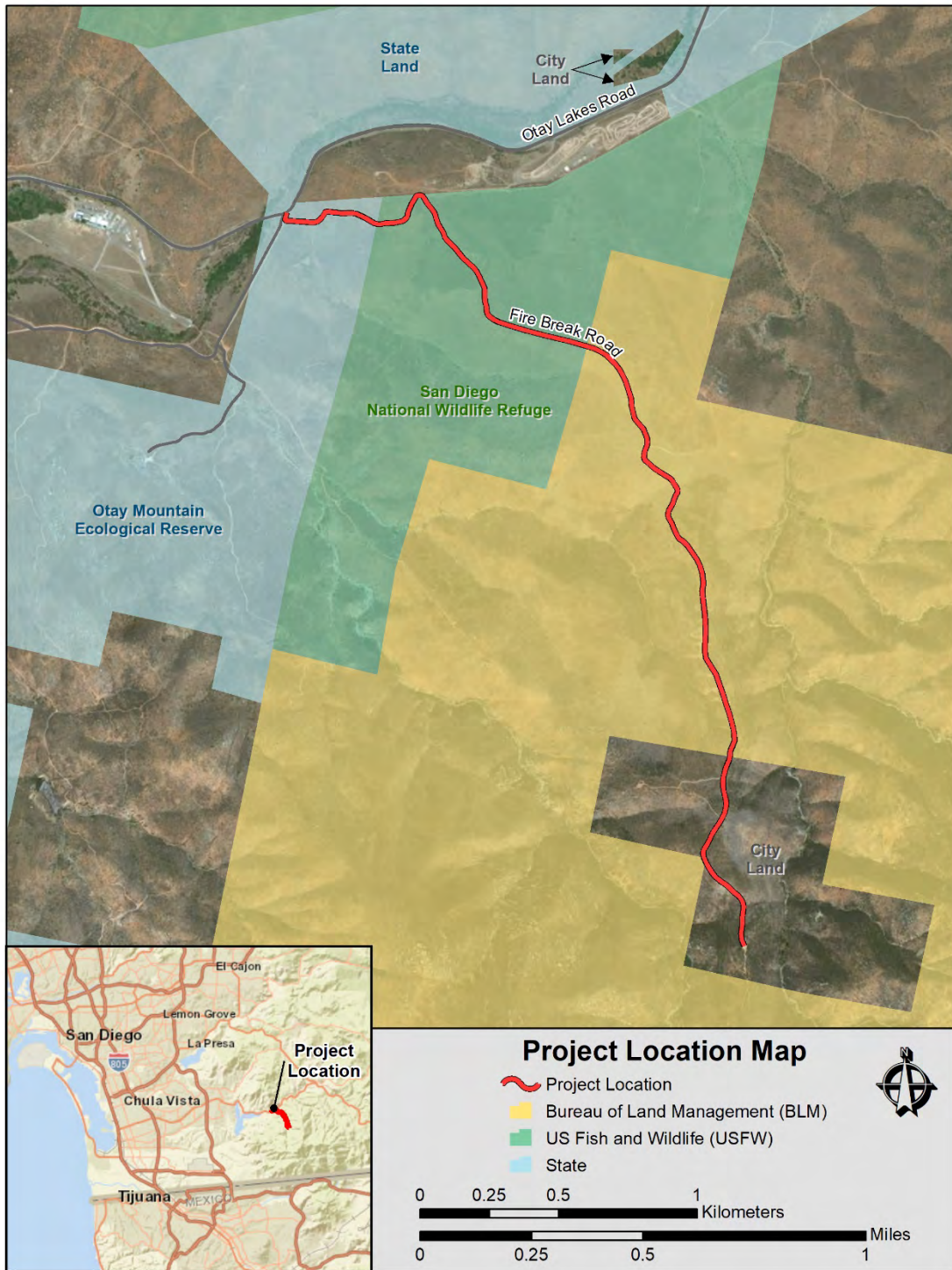
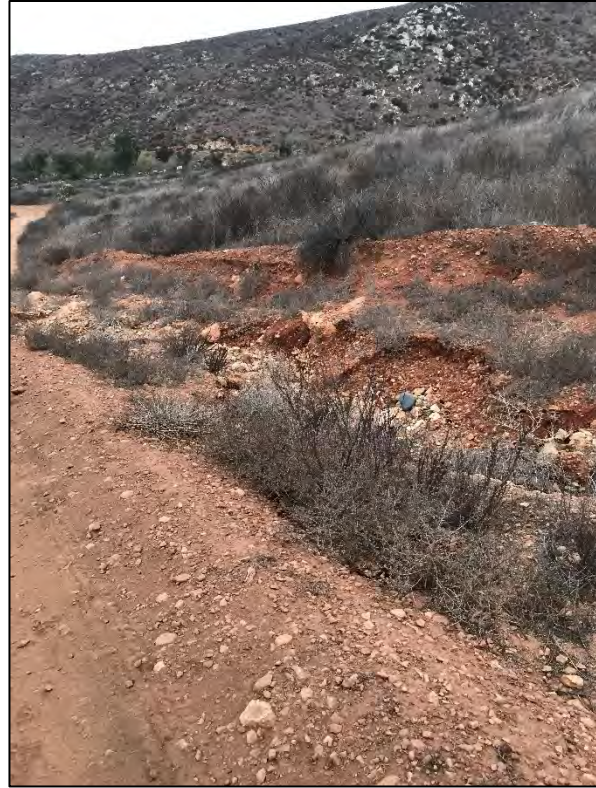


Figure 1-2. Project Location



Photograph 1-1. Vehicle traversing poor road conditions



Photograph 1-2. Erosion on existing roadbed

1.4 PUBLIC INVOLVEMENT

Agency and public involvement in the NEPA process promotes open communication between the public and the government and enhances the decision-making process. All persons or organizations having a potential interest in the Proposed Action are encouraged to participate in the decision-making process by submitting comments. NEPA and CEQ guidance direct agencies to make their NEPA documents available to the public during the decision-making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if additional information is provided to the public and the public is involved in the planning process.

Through the public involvement process, CBP will notify by mail all relevant Federal, state, and local agencies of the Proposed Action and the availability of the Draft EA. CBP will request input on environmental concerns these agencies could have regarding the Proposed Action. The public involvement process provides CBP with the opportunity to consider and incorporate state and local input in decisions regarding implementation of this Federal proposal.

CBP will coordinate with agencies such as USFWS; BLM; U.S. Army Corps of Engineers (USACE); CDFW; the State Historic Preservation Officer (SHPO), which is a component of the California Office of Historic Preservation; San Diego Regional Water Quality Control Board (RWQCB); San Diego County Air Pollution Control District; other local agencies; Native American tribes, and the public.

A Notice of Availability for the EA and draft Finding of No Significant Impact (FONSI) will be published in the *San Diego Union Tribune* for the purpose of soliciting comments on the Proposed Action and alternatives, and to involve the local community in the decision-making process.

Throughout the NEPA process, the public can obtain information concerning the status and progress of the EA via the project website at <https://www.cbp.gov/about/environmental-management-sustainability/documents/docs-review>. Comments received will be incorporated into the Final EA. Comment letters and other agency and public involvement materials will be included in **Appendix B** of the Final EA.

1.5 FRAMEWORK FOR ANALYSIS

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts from proposed Federal actions before those actions are taken. CEQ is the principal Federal agency responsible for the administration of NEPA. CEQ regulations mandate that all Federal agencies use a systematic, interdisciplinary approach to environmental planning and the evaluation of actions that might affect the environment. This process identifies and evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The process for implementing NEPA is codified in 40 CFR §§ 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify that an EA may be prepared for the following reasons:

- Providing evidence and analysis to determine whether to prepare a FONSI or an Environmental Impact Statement (EIS).
- Aiding in an agency’s compliance with NEPA when an EIS is unnecessary.
- Facilitating preparation of an EIS when one is necessary.

Within the Department of Homeland Security (DHS) and CBP, NEPA is implemented using DHS Instruction Manual 023-01-001-01 Rev. 01, *Implementing the National Environmental Policy Act*, and CBP policies and procedures.

To comply with NEPA, the planning and decision-making processes for actions proposed by Federal agencies require a study of other relevant environmental statutes and regulations. However, the NEPA process does not replace procedural or substantive requirements of other environmental statutes and regulations. Rather, it addresses them collectively in the form of an EA or EIS, enabling the decision maker to have a comprehensive view of major environmental issues and requirements associated with a proposed action. Per CEQ regulations, NEPA requirements must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently, rather than consecutively.”

Within the NEPA framework of environmental impact analysis, additional authorities that could be applicable include the Clean Air Act (CAA), Clean Water Act (CWA) (including a National Pollutant Discharge Elimination System [NPDES] stormwater discharge permit and Section 404 permit), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), National Historic Preservation Act (NHPA), Archaeological Resources Protection Act, and various Executive Orders. A summary of laws, regulations, and Executive Orders that could be applicable to the Proposed Action is presented in **Appendix C**.

CEQA (California Public Resources Code Sections 21000–21177) is a statute that requires the State of California and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to any discretionary action by a state or local agency. CEQA applies to projects that have the potential to result in a physical change to the environment or that might be subject to several discretionary approvals by governmental agencies, including construction activities, clearing of or grading land, improvements to existing structures, and activities or equipment involving the issuance of a permit.

For this project, CEQA is relevant because CBP would likely be required to obtain Section 401 certification from the San Diego Regional Water Quality Control Board for potential discharge to state or tribal waters, including wetlands. To paraphrase Section 15221 of the Guidelines for Implementation of the CEQA (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387), an EIS or EA and FONSI prepared under NEPA can be used instead of an Environmental Impact Report or Negative Declaration prepared under CEQA, provided the NEPA documentation meets CEQA requirements.

Table 1-1 lists major Federal and state permits, approvals, and interagency coordination that could be required regarding the proposed improvement, maintenance, and repair of 1418 Firebreak Road.

Table 1-1. Key Permits and Approvals (as applicable) and Interagency Coordination

Agency	Permit/Approval/Coordination
USACE	– CWA Section 404 permit
USFWS	– Section 7 ESA coordination/consultation – MBTA coordination
Native American Tribes	– Consultation regarding potential effects on cultural resources
California SHPO	– NHPA Section 106 consultation
California Water Quality Control Board, Region 9 (San Diego RWQCB)	– CWA Section 401 State Water Quality Certification – CWA NPDES permit
San Diego County Air Pollution Control District	– Clean Air Act permit consultation

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2 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section provides detailed information on CBP's proposal to improve, maintain, and repair 1418 Firebreak Road in the CHU AOR of the USBP SDC to support USBP operations. As discussed in **Section 1.5**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Alternatives must satisfy the purpose of and need for a proposed action, which are defined for this action in **Section 1.3**. CEQ guidance advocates the inclusion of a No Action Alternative against which potential effects can be compared. No action in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail as recommended by CEQ regulations.

2.2 SCREENING CRITERIA FOR ALTERNATIVES

Each alternative to the Proposed Action considered in the EA must meet CBP's purpose of and need for the Proposed Action (as described in **Section 1.3**). The following screening criteria were used to develop the Proposed Action and evaluate potential alternatives:

- ***Maintaining Situational Awareness.*** Proposed activities must provide USBP agents the ability to stay abreast of cross-border violations in the area of 1418 Firebreak Road.
- ***Facilitating Effective Response.*** Proposed activities must facilitate the efficient and effective response to cross border violations in the area of 1418 Firebreak Road.

2.3 ALTERNATIVE 1: PARTIAL ROAD IMPROVEMENT (PROPOSED ACTION)

Alternative 1 is the Proposed Action. Under this alternative, 1418 Firebreak Road would be improved to a FC-2 level, all-weather roadway for 4,885 feet (ft) from Otay Lakes Road to a point where the road enters the Otay Mountain Wilderness on BLM property (see **Figure 2-1**). FC-2 roads typically consist of two 3.6-meter (12 ft) travel lanes at a 4 percent cross-slope. A cross-slope is built into the road to provide a drainage gradient so that water will run off the surface to a drainage system such as a street gutter or ditch. Under the Proposed Action, 1418 Firebreak Road would be widened where necessary to ensure a minimum 24-ft width from Otay Lakes Road to the boundary of the Otay Mountain Wilderness. Parallel ditches with a 1-vertical to 3-horizontal (1V:3H) front slope and 1-vertical to 4-horizontal (1V:4H) backslope would be cut on the downslope side of the road to allow for proper drainage. Imported roadway material would be added to the road to achieve a minimum 150-millimeter (6-inch) deep, well-graded roadbed shaped with a defined crown section (see **Figure 2-2**). All necessary materials such as gravel, topsoil, or fill would be from existing developed or previously used sources, not from undisturbed areas adjacent to the project area. To the maximum extent practicable, all material sources would be certified weed-free.

Wherever possible, CBP would limit disturbance to the proposed width of the proposed FC-2 road and ancillary structures. Where turnouts and passing lanes would be required for construction, CBP would use currently disturbed areas (e.g., locations where a secondary trail has been created due to impassable road conditions), to the maximum extent practicable, and restore all such areas upon completion of the Proposed Action.

Equipment and materials would be stored at a staging area at the entrance to the project area. The staging area would be an unimproved, previously disturbed area (see **Figure 2-1**). The types and numbers of equipment used would be kept to a minimum. It is anticipated that backhoes, graders, and dump trucks would be necessary for road improvement activities. Water trucks would be employed to aid in dust suppression. All equipment would be cleaned prior to entering and departing the project corridor to minimize the spread and establishment of non-native invasive plant species.

Seven water bars would be installed in locations where washouts occur to allow the agents to drive on the designated road rather than seek an alternate route during flood events (see **Figure 2-1** and **Appendix D**). There are several areas along 1418 Firebreak Road with extensive damage due to agents driving outside of the road footprint to avoid severely washed out sections of the road (see **Photograph 1-2**). Water bars are frequently spaced, constructed drainage devices that use road material mounded in the road surface to interrupt the flow of water and divert it off the road surface (see **Figure 2-2** and **Photograph 2-1**). The frequency of water bar placement is determined by the road gradient within the impacted area. In road areas with an approximate 5 percent slope, the interval would typically be 125 ft. Should slopes of 5 – 10 percent be encountered, the interval would be reduced to 100 ft. Under the Proposed Action, the water bars would be designed to be drivable by high clearance vehicles (see **Figure 2-2**).

The finished road would be a reinforced roadbed with a soil stabilizer (e.g., Lignin, Soiltec, Envirotec, or some other suitable soil stabilizer) applied during the late summer/early fall months. Proper use of a non-toxic road stabilizer helps to avoid impacts on federally listed species habitat by minimizing road run-off and is neither toxic nor harmful to sensitive species.

Road maintenance and repair would include reactive maintenance and repair activities (e.g., resolving damage from use or severe weather events) and preventive/scheduled maintenance and repair activities designed to ensure ongoing operability and environmental sustainability (e.g., soil erosion preventive measures). All maintenance and repair would occur via a periodic work plan based on anticipated situations within each sector and funding availability. Maintenance and repair requirements could change over time based on changes in usage or priority but would likely occur at least annually and would not exceed the scope of the Proposed Action as described in this section.

Maintenance and repair would consist of grading and resurfacing existing areas of the roads that have been eroded by surface water flows, filling potholes, and removing protruding boulders. Trees and other vegetation within, or overhanging, the existing roadway would be trimmed, grubbed, or cut back to facilitate safe vehicle passage. Any vegetation that has established within the existing road would be removed, cleared, or trampled.

Some activities may need to be conducted in areas immediately adjacent to the existing road footprint (road edges). For example, equipment might need to be operated off existing roads to remove debris from ditches, and to access and maintain roads. Temporary impacts on vegetation and soil resulting from these activities would be minimized through appropriate heavy equipment operation techniques, such as installing temporary construction mats, reducing operating speeds, using the initial ingress and egress points, and selecting appropriately sized equipment for the area and project.

For water-control features (such as ditches), activities would include cleaning, maintaining, repairing, or replacing features, as needed. Implementing improved water drainage measures includes ensuring road crowns shed water and runoff flows to established drainage ditches or other water-control features as needed to control runoff and prevent deterioration of existing infrastructure or surrounding land. The stabilization of roads with the use of Soiltac™, a soil binder, would function as a means to reduce erosion and improve road strength. The application of Soiltac™ would be completed on an annual basis or less frequently, depending on need.

Heavy equipment would be needed for activities such as grading, filling, and compacting. Equipment staging would occur on the existing road footprint or at existing CBP laydown yards. All equipment would be hauled into sites as needed. Required equipment would likely include dump trucks, road graders, backhoes, bulldozers, drum roller/compactors, and water trucks.

2.4 ALTERNATIVE 2: COMPLETE ROAD IMPROVEMENT

Under this Alternative, 1418 Firebreak Road would be improved to a FC-2 level, all-weather roadway for the entire 12,983 ft from Otay Lakes Road to a point where the road terminates on the City of Chula Vista property that is surrounded by the Otay Mountain Wilderness area (see **Figure 2-1**).

Nine water bars would be installed where washouts occur to allow the agents to drive on the designated road rather than seek alternate routes during flood events. All construction methods would be as described in Alternative 1.

It is the current policy of BLM to prohibit road maintenance or improvements within the Otay Mountain Wilderness boundary. The Wilderness Act (16 U.S.C. 1131 et seq.) and the Otay Mountain Wilderness Act of 1999 do provide for exceptions that could grant BLM permission for authorizing these activities. The Otay Mountain Wilderness Act recognizes that, because of the proximity of the Wilderness Area to the U.S./Mexico international border, drug interdiction and border operations need to continue, provided such management actions are conducted in accordance with the Wilderness Act. In turn, Section 5 of the Wilderness Act states that:

...in any case where State-owned or privately-owned land is completely surrounded by national forest lands within areas designated by this Act as wilderness, such State or private owner shall be given such rights as may be necessary to assure adequate access to such State-owned or privately-owned land by such State or private owner and their successors in interest. (16 U.S.C. 1131 et seq.)

These provisions could provide a mechanism for potential improvement, maintenance, and repair activities to the southern portion of 1418 Firebreak Road. CBP has determined that it would be preferable to conduct the analysis for the entire Firebreak Road should a compelling need arise, in concurrence with BLM, for improvement, maintenance, and repair activities to occur.

2.5 ALTERNATIVE 3: IMPROVE DRAINAGE FEATURES WITHOUT WIDENING ROAD

Under this alternative, 1418 Firebreak Road would be improved to a FC-2 level, all-weather roadway for 4,885 ft from Otay Lakes Road to a point where the road enters the Otay Mountain Wilderness on BLM property. However, under this alternative, 1418 Firebreak Road would not be widened as it would be under the Proposed Action. All drainage and other improvements that would be implemented under the Proposed Action would also be implemented for Alternative 3. One turnout would be added. This alternative would minimize ground disturbance and would not change the existing footprint.

Seven water bars would be installed in locations where washouts occur to allow the agents to drive on the designated road rather than seek an alternate route during flood events. All construction methods would be as described in the Proposed Action.

Under this alternative, maintenance and repair of the road would include reactive maintenance and repair activities and preventive/scheduled maintenance and repair activities designed to ensure ongoing operability and environmental stewardship. All maintenance and repair activities would be as described in the Proposed Action but would be confined to the current road footprint. As with the Proposed Action, locations where a secondary trail has been created due to impassable road conditions would be restored upon completion of the project. The addition of material to the road would be kept to the minimum amount needed to achieve the proposed objective.

2.6 NO ACTION ALTERNATIVE

The other alternative that will be carried forward for analysis is the No Action Alternative, as recommended by CEQ regulations. Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road.

2.7 COMPARISON OF ALTERNATIVES

The following tables provide a summary comparison of each alternative. **Table 2-1** compares the features of each alternative. **Table 2-2** compares how the alternatives respond to the purpose of and need for the Proposed Action. A detailed comparison of the impacts that could occur as a result of implementing each alternative is provided in **Section 3.0**.

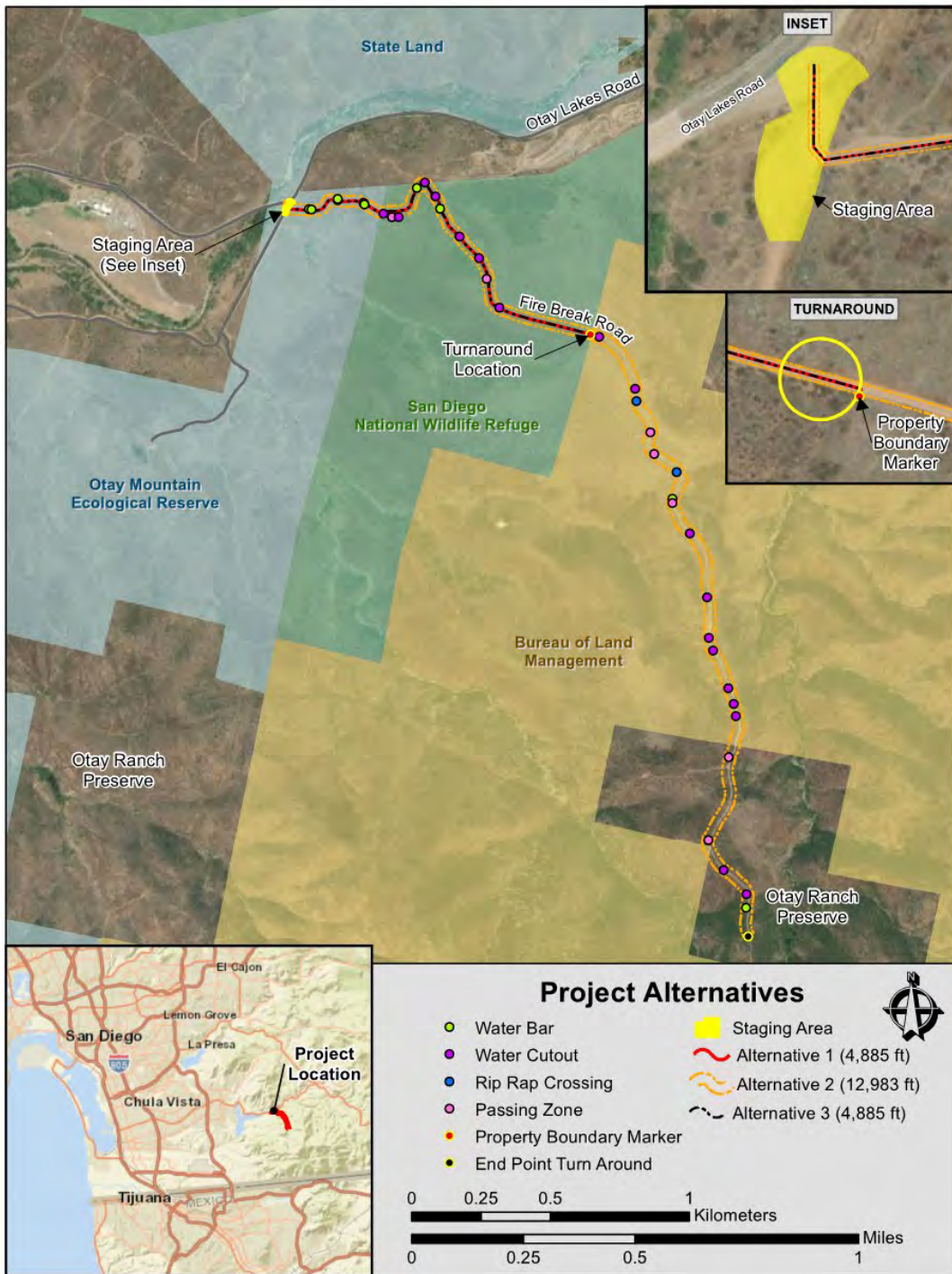


Figure 2-1. Project Alternatives

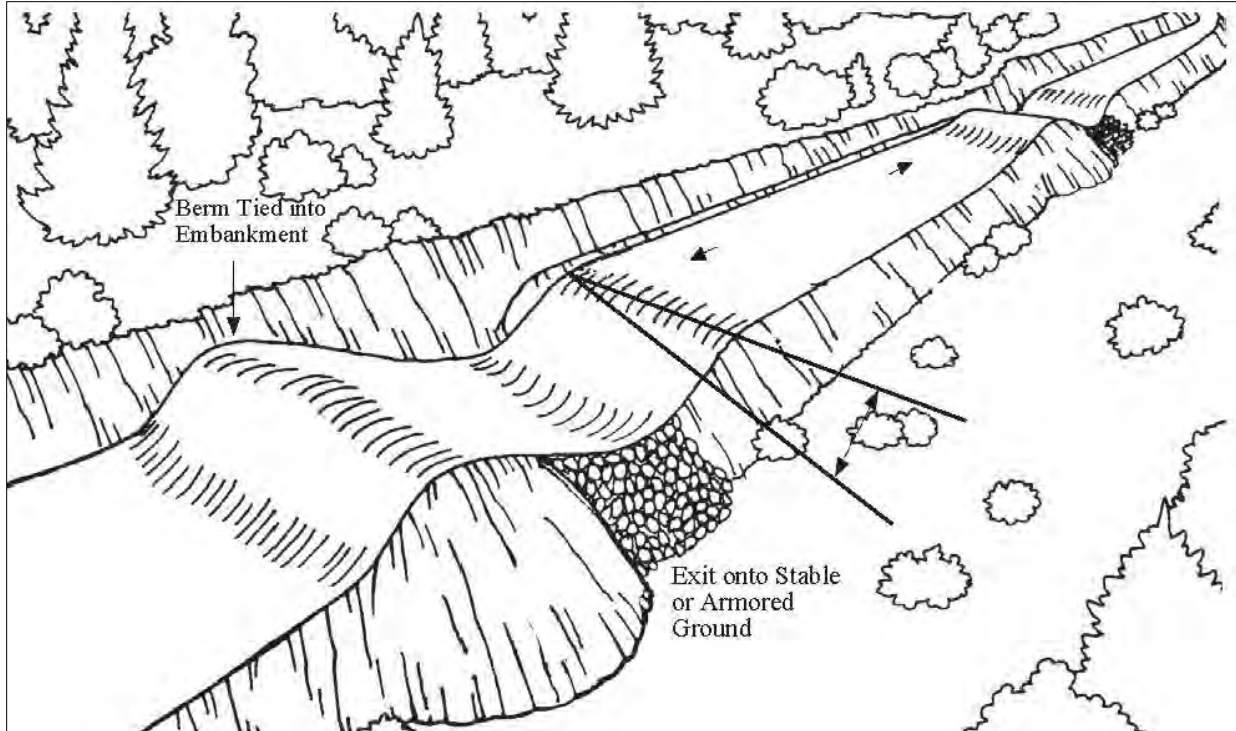


Figure 2-2. Example Water Bar Design and Construction (Keller and Sherar 2003)

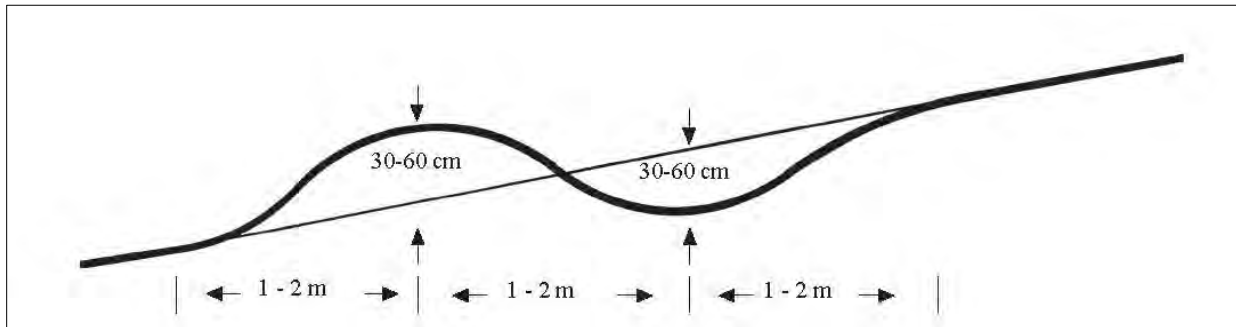


Figure 2-3. Water Bar Perspective View



Photograph 2-1. Example Water Bar Location



Photograph 2-2. Example Water Cutout Location

Table 2-1. Comparison of Features of Each Alternative

Features	Alternative 1 Partial Road Improvement	Alternative 2 Complete Road Improvement	Alternative 3 Improve Drainage Features Without Widening Road	No Action Alternative
Linear Footage of Road Repairs	4,885	12,983	4,885	0
Constructed to Meet FC-2 Design Standards	Yes	Yes	Partially	N/A
Construction Activity Confined to Existing Roadbed	No	No	Yes	N/A
Turnouts and Passing Lanes Constructed in Currently Disturbed Areas	Yes	Yes	Yes	N/A
Staging Area Required	Yes	Yes	Yes	N/A
Number of Water Bars Constructed	7	9	7	0
Application of a Soil Stabilizer	Yes	Yes	Yes	N/A

Key: N/A = Not Applicable
FC-2 design standards include a 24-foot road width.

Table 2-2. Comparison of Purpose and Need with Alternatives Summary

Purpose and Need	Alternative 1: Partial Road Improvement	Alternative 2: Complete Road Improvement	Alternative 3: Improve Drainage Features Without Widening Road	No Action Alternative
<p>Purpose: The road is critical to SDC’s ability to maintain easy access to otherwise inaccessible portions of the border region by linking Otay Lakes Road to Otay Mountain. The proposed activities would ensure that the road is passable, providing faster response time to border incidents in strategically valuable areas.</p>	Yes	Yes	Yes	No
<p>Need: The need for the Proposed Action is to ensure that the increased level of border security provided by 1418 Firebreak Road is not compromised by natural events or breaches in road integrity because of poor maintenance and repair. CBP must ensure that tactical infrastructure functions as it is intended.</p>	Yes	Yes	Yes	No

Key: FC-2 = roads typically consisting of two 3.6-meter (12-foot) travel lanes at a 4 percent cross-slope. Parallel ditches with a 1-vertical to 3-horizontal (1V:3H) front slope and 1-vertical to 4-horizontal (1V:4H) backslope allow for proper drainage. To achieve this standard, sufficient roadway material would be imported to achieve a minimum 150-millimeter (6-inch) deep, well-graded roadbed shaped with a defined crown section.

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3 AFFECTED ENVIRONMENT

This section provides a discussion of the affected environment, as well as an analysis of the potential direct and indirect impacts that the alternatives could have on the affected environment. Cumulative and other impacts are discussed in **Section 4**. All potentially relevant resource areas were initially considered in this EA. In accordance with NEPA, CEQ regulations, and DHS Instruction Manual 023-01-001-01, Rev. 01, this evaluation focuses on those resources and conditions potentially subject to effects, and on potentially significant environmental issues deserving of study. It does not go into detail on insignificant issues.

The following categories describe various types of impacts that could potentially result from the proposed project:

- *Short-term or long-term.* These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for maintenance and repair activities. Long-term effects are those that are more likely to be persistent and chronic.
- *Direct or indirect.* A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance, but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- *Negligible, minor, moderate, or major.* These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.
- *Adverse or beneficial.* An adverse effect is one having unfavorable, or undesirable, outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.

3.1 PRELIMINARY IMPACT SCOPING

Some environmental resources and issues that are often analyzed in an EA have been omitted from detailed analysis. The following provides the basis for such exclusions.

3.1.1 Socioeconomic Resources, Environmental Justice, and Protection of Children

Minority or low-income populations are present and could be affected by a project if the percentage of persons characterized as being a minority or low-income within the region of influence is either greater than 50 percent or meaningfully higher than in the general population or other appropriate unit of geographic analysis (e.g., community of comparison). The community of comparison should be the smallest jurisdiction for which U.S. Census data are collected that encompasses the footprint of impacts for all resource areas. CEQ also states, “A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds” (CEQ 1997).

Project activities would not have a significant effect on socioeconomic resources, environmental justice, or the protection of children, since there are no populations living within or nearby the survey area. Therefore, no effect on these resources would be anticipated, and therefore no detailed discussion is provided.

3.1.2 Roadways and Traffic

Project activities could cause short-term roadway closures and detours while work is underway; however, most of the roadways proposed for maintenance and repair are used solely by USBP. Therefore, the public would not be impacted by these roadway closures or detours. Roadway closures and detours would be temporary, so USBP patrols would experience only minor disruptions. As a result, impacts on roadways and transportation would be negligible and are not discussed further.

3.1.3 Hazardous Materials and Waste Management

Project activities could cause long-term adverse impacts on the environment as roadway construction vehicles containing hazardous substances and petroleum products would be deployed, which could result in a spill or release. Roadway construction would also generate solid wastes during grading and construction activities. Potential impacts from uncollected solid wastes include increased risk of injury, obstruction of draining areas, land and water pollution, and/or loss of biodiversity. However, these incidents are unlikely to occur and therefore impacts on the environment would be negligible and are not discussed further.

3.1.4 Aesthetic and Visual Resources

Project activities would not have a significant impact on aesthetic and visual resources as maintenance and repair activities would occur in remote areas on or directly adjacent to the existing footprint of the roadway and no additional infrastructure would be installed.. Therefore, no effect on aesthetic and visual resources would be anticipated, and therefore no detailed discussion is provided.

3.1.5 Health and Human Safety

Project activities could cause long-term beneficial impacts to health and human safety as the improved roadway would offer a more stable and safe driving surface for vehicles. Short-term,

negligible, adverse impacts on health and human safety could occur during construction; however, construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. Occupational Safety and Health Administration and the USEPA issue standards that specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits with respect to workplace stressors.

Contractors would be required to establish and maintain safety programs at the construction site. The proposed project would not expose members of the general public to increased safety risks. Therefore, because the Proposed Action would not introduce new or unusual safety risks, and assuming appropriate protocols are followed and implemented, detailed examination of safety is not included in this EA.

Additionally, due to the remote location of the region of analysis, the likelihood of this project impacting the health and safety of humans other than USBP agents and contractors or USBP personnel performing the road repairs is extremely low. However, minor, beneficial impacts on safety could occur from public use of repaired roads.

3.2 LAND USE

3.2.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meaning of various land use descriptions, “labels,” and definitions vary among jurisdictions.

Natural property conditions can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential effects on the proposed project corridor and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use in the proposed project corridor, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its permanence.

3.2.2 Affected Environment

The project area is in Proctor Valley, San Diego County, California, a region located within the Otay Subregional Plan Area. Proctor Valley is situated north of Otay Mountain and east of Lower Otay Lake. The nearest town is Otay Ranch, approximately 4 miles to the west. In general, land uses and ownership in and adjacent to the project area include public land; Federal, state, and local land; and vacant and undeveloped land. Public land includes cemeteries, religious facilities, libraries, post offices, fire or police stations, hospitals, military facilities, and educational institutions. Public land also includes land belonging to the Federal government in the public domain. Federal, state, and local land ownership include wildlife refuges, ecological reserves, conservation areas, and designated wildernesses lands owned by the Federal government. Vacant and undeveloped land is historically and currently vacant, and undeveloped land is land not placed in another land use category.

Land ownership within the project area is shown in **Table 3-1**. **Figure 2-1** illustrates the project alternatives and various landowners.

Land Ownership. The Otay subregional resource conservation areas have been recognized as having statewide significance, to include Lower Otay Reservoir, rare and endangered plants on the lower mesa areas, and Otay Mountain.

The project area occurs on portions of the Otay Mountain Ecological Reserve (OMER), which is managed by the California Fish and Game Commission. The OMER is a public reserve of about 1,200 acres that hosts many sensitive species and habitats. Permitted uses of land in the OMER include hiking, wildlife viewing, and hunting with valid licenses.

Land in the San Diego NWR also composes parts of the project area. This NWR is managed by USFWS and is part of a USFWS contribution to the Multiple Species Conservation Program (MSCP), a landscape-wide habitat conservation plan to preserve habitat and species while allowing for appropriate development. Permitted uses of the land include hiking, wildlife viewing, bike riding, and horseback riding.

Alternative 2 is on portions of BLM land composing the Otay Mountain Wilderness. Otay Mountain is predominantly under BLM ownership. BLM is responsible for managing public lands and resources for multiple uses. BLM land within and around the project area is used for recreational purposes, such as hunting, hiking, horseback riding, camping, wildlife viewing, and other wilderness activities.

Alternative 2 is also on a portion of the Otay Ranch Preserve owned by the City of Chula Vista. This preserve was authorized in 1996 through an agreement between the County of San Diego and the City of Chula Vista. The Preserve includes more than 11,000 acres set aside as mitigation for impacts on sensitive resources resulting from development occurring both in the county and the city.

Table 3-1. Land Ownership within the Project Area

Owner	Project Acreage	Agency	Designation Type	Name
California Department of Fish and Wildlife	2.88	State	State Conservation Area	Otay Mountain Ecological Reserve
U.S. Fish and Wildlife Service	8.22	Federal	National Wildlife Refuge	San Diego National Wildlife Refuge
Bureau of Land Management	12.86	Federal	National Public Lands	Otay Mountain Wilderness (managed by the Palm Springs/South Coast Field Office)
City of Chula Vista	5.84	Local government (managed by the County of San Diego)	Local Conservation Area	Otay Ranch Preserve

Source: USGS 2019a

Regulatory Setting. Several Federal, state, and local land use plans, policies, and regulations could be relevant to the project area for the Proposed Action. These land use plans, policies, and regulations are identified in the following paragraphs.

Otay Mountain Wilderness Act of 1999. In 1999, the Otay Mountain Wilderness became part of the approximately 109-million-acre National Wilderness Preservation System. Consequently, it is BLM policy to prohibit road maintenance or improvement within the Otay Mountain Wilderness boundary; however, the Wilderness Act (16 U.S.C. 1131 et seq.) and the Otay Mountain Wilderness Act of 1999 do provide for exceptions that could grant BLM permission for authorizing proposed activities for Alternative 2. These exceptions could provide a mechanism for potential improvement, maintenance, and repair activities to the southern portion of 1418 Firebreak Road.

San Diego County General Plan/Otay Subregional Plan. The San Diego County General Plan is a framework for the future growth and development of the unincorporated areas of the county, particularly in the western communities. It is based on a set of 10 guiding principles designed to protect the county’s unique and diverse natural resources and maintain the character of its rural and semi-rural communities. It reflects an environmentally sustainable approach to planning that balances the need for adequate infrastructure, housing, and economic vitality, while maintaining and preserving unique communities, agricultural areas, and open space. The General Plan provides a consistent framework for land use and development decisions consistent with an established community vision. An unincorporated community’s vision, characteristics, and issues are addressed in more specific Community Plans, such as the Otay Subregional Plan. The San Diego County General Plan identifies goals and policies relevant to land use within 10 chapters, including Land Use, Housing, Circulation (Mobility), Conservation and Open Space, Safety, and Noise.

San Diego County Zoning Ordinance. The San Diego County Zoning Ordinance regulates land uses within the unincorporated areas of the county by dividing the land into zones based on the present and potential uses of the land. A “zone” is the combination of human and animal use, development type, and special planning area regulations. The San Diego County Zoning Ordinance does not apply to federally owned public lands within the county, which are defined as parcels that are identified as federally owned public lands by the San Diego County Assessor. It should be noted that most of the project area falls within these federally owned public lands.

San Diego County Board of Supervisors Policies. The following San Diego County Board of Supervisors policies could be relevant to construction and operation of facilities under Alternative 1:

- ***Policy I-18.*** Right-of-way dedication and public improvement requirements in connection with major and minor use permits.
- ***Policy I-49.*** Distribution of notification of land use hearings.
- ***Policy I-81.*** Easements and right-of ways on county-owned or special district-owned real property.
- ***Policy I-100.*** Minor encroachments into an open space easement.
- ***Policy I-122.*** Use of the county’s five percent allowable loss of coastal sage scrub by other jurisdictions.
- ***Policy I-138.*** Mitigation on county-owned land managed by the department of parks and recreation.

Multiple Species Conservation Program (MSCP). The MSCP is a comprehensive habitat conservation planning program that addresses multiple species habitat needs and the preservation of native vegetation communities in San Diego County. The MSCP is a subregional plan under the Natural Communities Conservation Program that is implemented through local subarea plans, which describe specific implementing mechanisms for the MSCP.

CBP is not a signatory to the MSCP and, therefore, is not required to comply with MSCP-specific mitigation requirements and ratios. However, wherever possible, CBP would comply with such requirements and ratios. Any CBP mitigation requirements are fulfilled through ESA Section 7 consultation with USFWS. Therefore, USBP is permitted to perform activities within any preserve, subject to applicable requirements of Federal and state law with no additional permit requirements associated with the MSCP. Additionally, projects within Tier IV habitats, which include disturbed and agricultural lands, would not be required to mitigate for impacts on habitat pursuant to the South County Subarea Plan (County of San Diego 1997). See **Sections 3.3.2** and **3.4.2** for more information on the MSCP.

3.2.3 Environmental Consequences

3.2.3.1 Alternative 1: Partial Road Improvement (Proposed Action)

Following the implementation of this alternative, the land use would remain the same. Alternative 1 is only on OMER and the San Diego NWR land and stops before entering the Otay Mountain Wilderness on BLM property. CBP would comply with all MSCP-specific mitigation requirements and ratios, including restrictions on motorized vehicles and permanent roads. Alternative 1 would be compatible with the existing land use categories and would not impact land use.

3.2.3.2 Alternative 2: Complete Road Improvement

Following the implementation of Alternative 2, land use would remain the same. Alternative 2 is on land composed of the OMER, San Diego NWR, Otay Mountain Wilderness, and Otay Ranch Preserve. Short-term, minor impacts would occur from construction and use of staging areas during construction. Long-term, negligible to minor, adverse impacts would be anticipated due to converting vegetated land to expand the roadway. A greater area of vegetation would be converted into parts of the improved 1418 Firebreak Road than in Alternative 1. A greater area of land than Alternative 1 would be converted into turnouts and passing lanes along the roadway. Improvements on BLM land would be prohibited under the *Otay Mountain Wilderness Act of 1999*; however, exceptions granted to CBP could allow for road improvements. Construction activities within the Otay Ranch Preserve would comply with the *Otay Subregional Plan* and the *San Diego County Zoning Ordinance* and would adhere to all relevant San Diego County Board of Supervisors policies. CBP would also comply with all MSCP-specific mitigation requirements and ratios, including restrictions on motorized vehicles and permanent roads. Alternative 2 would be compatible with existing land use categories and would not significantly impact land use.

3.2.3.3 Alternative 3: Improve Drainage Features Without Widening Road

No new construction or change in land use would occur under Alternative 3; all activity would be confined to repair and maintenance of the current road footprint. CBP would comply with all MSCP-specific mitigation requirements and ratios. No effects on land use would be expected as a result of Alternative 3.

3.2.3.4 No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, or improving the road. CBP enforcement actions would be maintained at current levels or diminish over time due to inaccessibility of the area to CBP agents. CBP would comply with all MSCP-specific mitigation requirements and ratios. The No Action Alternative would result in continuation of existing land uses. No effects on land use would be expected as a result of the No Action Alternative.

3.3 GEOLOGY AND SOILS

3.3.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and

physiography, geology, soils, and, where applicable, geologic hazards and paleontology. Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with certain construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and that is also available for these uses. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to non-agricultural uses. The Natural Resources Conservation Service (NRCS) is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

3.3.2 Affected Environment

Regional Geology. The project is within the Lower Californian sub-province of the Pacific Geologic Province. The sub-province includes the Peninsular Ranges and the coastal area of San Diego. The Peninsular Ranges extend into the Los Angeles Ranges to the north and form the Baja Peninsula to the south. The Peninsular Ranges are composed of batholithic rock formed under extreme heat and pressure by solidification of magma deep within the earth's crust. Uplift and tilting of the Peninsular Range resulted in the Elsinore and San Jacinto Faults, which form the eastern boundary of the Pacific Geologic Province. The western portion of the Lower Californian sub-province is composed of dissected, mesa-like terraces that graduate inland into rolling hills. The terrain here is underlain by sedimentary rocks composed mainly of sandstone, shale, and conglomerate beds, reflecting the erosion of the Peninsular Ranges.

The Otay Mountain area is part of the San Ysidro Mountains, which lies just north of the U.S.-Mexico border in San Diego County. Otay Mountain is part of a zone of Late Jurassic (176–200 million years old) rocks, termed the Santiago Peak Volcanics. These rocks consist of a complex blend of volcanic and sedimentary rocks formed within a submarine island-arc environment. Elevation ranges from 400 ft along the western portion to about 3,550 ft on Otay Mountain. The area rises above a mesa on the west and is deeply dissected by numerous ephemeral streams. The streams have cut steep, narrow canyons or ravines into the hillsides that dominate the area, making it extremely rugged terrain.

Topography. Elevations in the project area range from approximately 500 ft at the northern portion of the road to approximately 1,500 ft at the southern portion of the road.

Soils. Five soil associations occur within the limits of the project area (Soil Survey Staff 2019b; Bowman 1973). The southern portions of the road are predominantly characterized by San Miguel Exchequer soils, and the northern portions of the road are predominantly Olivenheim cobbly loam soils. The remaining soils are small areas of Friant rocky fine sandy loams and Redding cobbly loams on the northern portion of the project area. Of the five soil associations mapped, the Olivenhain cobbly loams, with 9 to 30 percent slopes, have a moderate potential for erosion, while the remaining soils have a severe potential for erosion. Limitations to construction also range from moderate to severe. There is no perennial water source within the survey area. Figures in **Appendix E** contain more detailed picture of soils in the project area.

Prime Farmland. Of the five soil associations mapped within the project area, none are considered prime farmland. Because no prime farmland soils exist within the project area, further analysis of the environmental consequences of Alternatives 1, 2, and 3 on prime farmland are not needed.

Geologic Hazards. Geologic hazards are prevalent throughout Southern California in the form of seismic events, landslides, debris flows, and rock falls. There are thousands of recognized faults in California, of which a very small number pose significant hazards. While tectonic plate motion is constant, pressure can build along the fault lines and can be released as earthquakes. The maximum size of an earthquake is related to the length of the fault. No faults are in the project area; however, the Rose Canyon fault zone and Elsinore fault zone are to the west and east of the project area, respectively. These faults have a relatively low average slip rate (rate of movement) of 2 to 5 millimeters per year. Faults with lower slip rates have correspondingly longer times between earthquakes. Major fault systems within the vicinity of the project area are outlined in **Table 3-2**.

Seismic movement has been assessed by the U.S. Geological Survey (USGS) and California Geological Survey (CGS), which has produced seismic hazard maps based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from the quake source. The Earthquake Shaking Potential maps show the levels of horizontal shaking that have a 2 in 100 chance of being exceeded in a 50-year period. The project area is within the earthquake hazard zone associated with the lowest intensity, indicating it is relatively distant from known, active faults and would experience lower levels of shaking less frequently. In this hazard zone, most earthquakes would only cause damage to weaker, masonry buildings; however, very infrequent earthquakes could still cause strong shaking. Historically, there have been up to 6-7 magnitude earthquakes in the vicinity of the project area.

Per the CGS, the project area has not been evaluated for liquefaction or landslides. The project area ranges from a deep-seated Landslide Susceptibility of Class V to Class IX. Weak rocks and steep slopes are most likely to generate landslides.

Table 3-2. Major Faults within the Vicinity of 1418 Firebreak Road

Fault Name	County	Estimated Fault Slip Rate	Fault Class
La Nacion Fault Zone	San Diego	Unspecified	A*
Elsinore Fault Zone	San Diego/Imperial	2-5 mm/year	A

Newport-Inglewood-Rose Canyon Fault Zone	San Diego	2-5 mm/year	A
San Jacinto Fault Zone	San Diego/Imperial	6-15 mm/year	A

*Geologic evidence demonstrates the existence of a Quaternary Period fault of tectonic origin, whether the fault is exposed for mapping or inferred from liquefaction or other deformational features.

Source: USGS 2019b.

3.3.3 Environmental Consequences

Protection of unique geological features, minimization of soil erosion, and siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be major and adverse if they would alter the lithology (i.e., the character of a rock formation), stratigraphy (i.e., the layering of sedimentary rocks), and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function within the environment.

3.3.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Regional Geology. Alternative 1 would not expose people or structures to substantial adverse effects, nor would it entirely remove a geologic resource. Alternative 1 would not alter rock formations or layering of sedimentary rock. Negligible impacts on geology would be anticipated from the implementation of Alternative 1.

Topography. Long-term, negligible, adverse impacts on topography would be anticipated from grading activities that would locally alter existing topography. The majority of areas proposed for grading have been previously graded, and, therefore, impacts would be negligible.

Soils. Under Alternative 1, road improvements to 4,885 ft of road would stop further deterioration of road conditions and prevent future erosion of the road surface from occurring. The application of soil stabilizing agents and the construction of water bars would result in safer driving conditions and reduce the potential for future deterioration of the road.

With the implementation of Alternative 1, primarily Olivenheim cobbly loam soils would be collectively impacted; however, a majority of the soils have already been disturbed by the existing road and its turnouts and secondary trails. Construction and grading activities would result in short-term, minor, adverse impacts on soil resulting from erosion and sedimentation. Grading activities in more rugged terrain could result in greater potential for soil erosion and sedimentation than in flat terrain. Erosion-and-sediment-control plans would be developed and implemented both during and following road improvements to contain soil and runoff on site and would reduce the potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff. Once grading activities have subsided, and soils have once again compacted under vehicle weight, soil erosion would be much less likely to occur. Expansion of the road to 24 ft in locations where

that standard is not currently met could involve removal of some loose sediment and soil. Improvements to the existing road would permanently impact Olivenheim cobbly loam soils due to road widening.

Maintenance of roads would reduce the effects incurred from negligence, such as rutting, washout, and long-term soil erosion. Proper crowning of the road to manage stormwater runoff would also reduce the potential for soil erosion and sedimentation. Therefore, maintenance of the road would result in a long-term, beneficial impact on soils. Upon completion of the construction of the project, all disturbed areas would be seeded and mulched immediately, thereby further stabilizing the soil.

With the implementation of Alternative 1, soil erosion would decrease, and the integrity of the surrounding soil would be maintained. Loss of soil and topsoil would decrease with the proposed installation of the water bar system. Furthermore, Olivenheim cobbly loam soils are moderately suitable for road-building uses. Therefore, impacts on soils are considered minor and insignificant.

Geologic Hazards. Continued maintenance and repair would be beneficial to reduce the future deterioration of the road and remove debris following a potential geological event. Best management practices (BMPs) would be implemented to minimize soil erosion and sedimentation. Alternative 1 would not expose people or structures to substantial adverse geologic hazard effects.

3.3.3.2 Alternative 2: Complete Road Improvement

Regional Geology. Alternative 2 would not expose people or structures to substantial adverse effects or remove a geologic resource. Alternative 2 would not alter rock formations or layering of sedimentary rock. Negligible impacts on geology would be anticipated from the implementation of Alternative 2, which would be similar to, but slightly greater than, impacts resulting from Alternative 1.

Topography. Long-term, negligible, adverse impacts on topography would be anticipated from grading activities that would locally alter existing topography. The majority of areas proposed for grading have been previously graded, and, therefore, impacts would be negligible; however, impacts would be greater than those for Alternative 1 due to improving more than twice the length of road.

Soils. Under Alternative 2, road improvements for the entire 12,983 ft of road would stop further deterioration of road conditions and prevent future erosion of the road surface from occurring. The application of soil stabilizing agents and the construction of water bars would each result in safer driving conditions and reduce the potential for future deterioration of the road. Impacts on soils under Alternative 2 would be anticipated to be similar to, but greater than, impacts from Alternative 1 due to the larger project area.

With implementation of Alternative 2, primarily Olivenheim cobbly loam soils and San Miguel Exchequer soils would be impacted; however, a majority of the soils have already been disturbed by the existing road and its turnouts and secondary trails. Construction and grading activities would result in short-term, minor, adverse impacts on soil resulting from erosion and sedimentation. Grading activities in more rugged terrain could result in greater potential for soil erosion and sedimentation than in flat terrain. However, erosion-and-sediment-control plans would be developed and implemented both during and following road improvements to reduce the potential

for adverse effects associated with erosion and sedimentation and transport of sediments in runoff. Once grading activities have subsided, and soils have once again compacted under vehicle weight, soil erosion and sedimentation into nearby water bodies would be much less likely to occur. Expansion of the road to 24 ft in locations where that standard is not currently met could involve removal of some loose sediment and soil. Improvements to the existing road would permanently impact Olivenheim cobbly loam and Miguel Exchequer soils due to road widening.

Maintenance of roads would reduce the effects incurred from negligence, such as rutting, washout, and long-term soil erosion. Proper crowning of the road to manage stormwater runoff would also reduce the potential for soil erosion and sedimentation. Therefore, maintenance of the road would result in a long-term, beneficial impact on soils. Upon completion of the construction of the project, all disturbed areas would immediately be seeded and mulched.

With the implementation of Alternative 2, soil erosion would decrease, and the integrity of the surrounding soil would be maintained. Loss of soil and topsoil would decrease with the proposed installation of the water bar system. Olivenheim cobbly loam soils are moderately suitable for road-building uses; however, the Miguel Exchequer soils on the southern portion of the road are poorly suited for road-building uses, mainly due to runoff potential and a very high erosion hazard. While impacts on soils would be considered minor and insignificant, the impact from the implementation of Alternative 2 would be greater than impacts from Alternative 1 due to additional maintenance and construction activities on the longer stretch of road.

Geologic Hazards. Alternative 2 would not expose people or structures to substantial adverse geologic hazard effects. The geologic hazard impacts for Alternative 2 would be similar to, or slightly greater than, those described for Alternative 1, due to the larger project area.

3.3.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Regional Geology. Alternative 3 would not expose people or structures to substantial adverse effects or entirely remove a geologic resource. Alternative 3 would not alter rock formations or layering of sedimentary rock. Negligible impacts on geology would be anticipated from the implementation of Alternative 3.

Topography. Long-term, negligible, adverse impacts on topography would be anticipated from increased erosion and sedimentation that would locally alter existing topography. Although areas proposed for re-grading have been previously graded, impacts on topography would be anticipated to be long-term, negligible, and adverse because existing topography would be locally altered.

Soils. Under Alternative 3, CBP would repair the current two track road and make drainage and other improvements. Because of the lack of formal construction design, FC-4 roadways are subject to greater deterioration than FC-2 roadways if left unmaintained. When subjected to heavier traffic, rutting occurs, which in turn is exacerbated by rain events that further erode the surface.

Maintenance and repair of FC-4 roads such as grading and other ground-disturbing activities would result in erosion and sedimentation. Maintenance of FC-4 roads include filling in potholes and re-grading and compacting road surfaces in areas that have been severely eroded. These activities would result in short- and long-term, minor, adverse impacts on soil resulting from erosion and sedimentation if compaction does not occur during or immediately after the grading process.

Grading activities in more rugged terrain could result in greater potential for soil erosion and sedimentation than in flat terrain, increasing the need for immediate compaction.

Unmanaged stormwater flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. As drainage improvements would be made under this alternative, no short- or long-term, adverse impacts on soils would be expected due to increased erosion potential. Under Alternative 3, Impacts on soils would be similar to Alternative 1 due to the implementation of such drainage improvements.

Geologic Hazards. Alternative 3 would not expose people or structures to substantial adverse geologic hazard effects. The geologic hazard impacts are similar to or slightly greater than those described in Alternative 1 due to the potential for a higher frequency of maintenance and repairs activities.

3.3.3.4 No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, or improving the road. CBP enforcement actions would be maintained at current levels or diminish over time due to inaccessibility of the area to CBP agents. Under this alternative, CBP agents could be exposed to injury in the event of road failure and illegal foot traffic would continue to impact the project area and the Otay Mountain Wilderness.

Under the No Action Alternative, road conditions would continue to deteriorate, resulting in increased soil and sediment erosion. The No Action Alternative could therefore result in greater impacts on soils than Alternatives 1, 2, or 3, due to the greater potential for soil erosion and sedimentation without key maintenance and repair activities to the road.

3.4 VEGETATION

3.4.1 Definition of the Resource

Vegetation includes native or naturalized plants and the habitats in which they exist. This section includes a description of all plants, plant communities, and their habitats occurring within the boundaries of the proposed 1418 Firebreak Road improvement area. This section describes the affected environment, including native and non-native vegetation occurring within the 7.66-acre impact area. Local special-status or rare vegetation species as defined by California Natural Diversity Database (CNDDB) (CNDDB 2019), San Diego County MSCP, California Native Plant Society Inventory records (CNPS 2019a), and U.S. Department of Agriculture Natural Resource Conservation Service Soil Survey Data (Soil Survey Staff 2019a) are discussed in this section and are considered in the same general manner as the vegetation communities and other plant species discussed in this section and are not analyzed individually by species in this EA. Federal and state threatened, endangered, and candidate plant species are discussed in **Section 3.6**.

Surveys were conducted from February 2019 through September 2019 to identify suitable habitats for special-status species. The survey area included a 50-foot corridor from the road centerline, totaling a 100-foot wide boundary along the entire length of 1418 Firebreak Road. Habitat conditions observed in the project area were used to evaluate the potential for occurrence of

special-status species based on these searches and the professional expertise of the investigating biologists. The potential for each special-status species to occur in the project area was then evaluated according to the following criteria:

- *No Potential.* Habitat on and adjacent to the site is clearly unsuitable for the species' requirements. For wildlife, this is based on a lack of one or more essential habitat elements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime). Species surveys are not considered necessary.
- *Unlikely.* Few of the habitat components meeting the species' requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site. Species surveys are not considered necessary but could be performed to confirm species absence.
- *Moderate Potential.* Some of the habitat components meeting the species' requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site. Species surveys could be necessary to determine presence, extent, density, and details of species distribution.
- *High Potential.* Most or all of the habitat components meeting the species' requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site. If species surveys are not conducted, then it is recommended that the species is assumed to be present. Species surveys could be necessary to determine extent, density, and details of species distribution.
- *Present.* Species was observed on the site or has been documented recently as being on the site. Focused species surveys could still be needed to determine extent, density, and details of species distribution.

3.4.2 Affected Environment

Two-thousand forty-seven plants species have been documented within San Diego County (Rebman and Simpson 2014). Of these species, 1,689 are native to the county and 758 are non-native and naturalized. A total of 96 plants species were documented within the project area during surveys, including 94 native species.

Vegetation communities were surveyed during biological surveys conducted in spring and September 2019 and described in a biological survey report (CBP 2020). Prior to these surveys, data from the Web Soil Survey (Soil Survey Staff 2019b) and aerial photographs of the site (Google Earth 2019) were examined to determine whether any unique soil types that could support sensitive plant communities and/or aquatic features were present in the project area. Biological communities observed were classified using the National Vegetation Classification System (NVCS). The vegetation was mapped based on existing NVCS plant community descriptions discussed in A

Manual of California Vegetation (Sawyer et al. 2009) and *A Manual of California Vegetation, Online Edition* (CNPS 2019b), NatureServe’s Classification of Ecological Communities (NatureServe 2019), and the *Vegetation Classification Manual for Western San Diego County* (Sproul et al. 2011). These references describe communities down to the alliance or association level, which are the two most detailed levels of vegetation community classification. Associations are one step more specific than alliances. Vegetation communities within the project area were mapped to the association level, whenever possible.

Vegetation communities found within the project area include *Adenostoma fasciculatum-Xylococcus bicolor-Ceanothus tomentosus* Association (Chamise chaparral), *Bahiopsis lacinata-Artemisia californica-Eriogonium fasciculatum* Association (Coastal Sage Scrub), Disturbed Bare Ground, *Hesperocyparis forbesii* Alliance (Southern Interior Cypress Forest), Mediterranean California Naturalized Annual and Perennial Grassland Semi-Natural Stands (Non-native Grassland/Coastal Sage Scrub), *Nassella* ssp. Association (Native Grassland), *Raphanus sativus* Ruderal Forbland (Non-native Grassland) (USNVC 2019; Sproul et al. 2011).

Sensitive biological communities include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, Habitat Conservation Plans, or regulations by the CDFW. The CDFW ranks sensitive communities as “threatened” or “very threatened” and keeps records of their occurrences in its CNDDDB (CDFW 2019). CNDDDB vegetation alliances are ranked 1 through 5 based on NatureServe’s (2018) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3.

For the purposes of this EA, any vegetation community that would be considered a Tier I or Tier II sensitive community per the San Diego MSCP (County of San Diego 1997) was considered sensitive, regardless of the CDFW ranking. The MSCP uses plant community descriptions described in the *A California Flora and Supplement* (Munz 1968), and *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), which are different classification systems that predate alliance- and association-level classifications. A classification conversion crosswalk (CNPS 2019b) was used to convert mapped alliances into the MSCP, which used Munz and Holland classifications to determine sensitivity. If a mapped vegetation community within the project area did not fit into one of the MSCP’s described communities, the CDFW ranking was used to determine sensitivity. Vegetation communities along with their associated CDFW rank, respective acreages within the survey area, and respective acreage in the impact area are summarized in **Table 3-3**.

Table 3-3. Vegetation Communities Occurring in the Project Area

Vegetation Community	CDFW Rank	Acres in Survey Area	Acres in Impact Area for Alternative 1	Acres in Impact Area for Alternative 2	Acres in Impact Area for Alternative 3
Chamise Chaparral	Tier 3	11.98	0.35	1.44	0.02
Coastal Sage Scrub	Tier 2	4.38	0.48	0.59	0.01
Disturbed	No Rank	4.64	1.75	4.32	1.11
Native Grassland	Tier 1, G4, S4	0.36	0.00	0.06	0.00
Non-Native Grassland	No Rank	0.06	0.02	0.02	0.00
Non-Native Grassland/Coastal Sage Scrub	No Rank	8.18	0.52	1.15	0.02
Southern Interior Cypress Forest	Tier 1, G2, S2	0.67	0.00	0.08	0.00
Total		30.27	3.12	7.66	1.17

These vegetation communities vary in species composition and levels of anthropogenic disturbance, from relatively undisturbed chamise chaparral and coastal sage scrub communities throughout the project area, to non-native, grassland-dominated communities along access road edges and at the southern terminus of 1418 Firebreak Road. Vegetation communities were identified during site visits and mapped to the association level where possible using field-verified aerial photographs. In some cases, it is necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. The vegetation community descriptions below are based on conditions observed during the 2019 surveys. Maps of the observed vegetation communities can be found in **Appendix F**.

Native Vegetation. A total of 11.98 acres of chamise chaparral were mapped across a majority of the project area. Chaparral is generally composed of hard-stemmed shrubs with leathery leaves that avoid desiccation during the dry season (Dudek 2012). Common species in this vegetation community that were observed during the 2019 biological surveys include chamise (*Adenostoma fasciculatum*), mission manzanita (*Xylococcus bicolor*), hairy ceanothus (*Ceanothus oliganthus*), ashy spike-moss (*Selaginella cinerascens*), and wire-lettuce (*Stephanomeria* sp.).

The northern and southern extents of the project area contain 4.38 acres of coastal sage scrub. This vegetation community is characterized by soft, low, aromatic shrubs and sub-shrubs characteristically dominated by drought-deciduous species. This community typically occurs on sites with low moisture availability, such as dry slopes and clay-rich soils that are slow to release stored water (Dudek 2012). This land cover type was dominated by San Diego County viguiera (*Bahiopsis lacinata*), California sagebrush (*Artemisia californica*), and California buckwheat

(*Eriogonium fasciculatum*), with co-dominant plant species being clustered tarweed (*Deinandra fasciculata*), coastal goldenbush (*Isocoma menziesii*), and turkey mullein (*Croton setiger*).

The project area contains 4.64 acres of disturbed unvegetated areas, which include bare patches of dirt where vegetation is constantly disturbed or removed such that little to no vegetation persists. Disturbed unvegetated areas include all unpaved access roads and areas that are constantly disturbed due to vehicle traffic but are not concrete or gravel roads.

A total of 0.67 acres of southern interior cypress forest were mapped in the project area. This vegetation community is a moderately dense, fire-maintained, low forest. The canopy is open to intermittent, depending on stand age and substrate development, with trees up to 52 feet tall. This vegetation community often occurs as isolated groves within a matrix of chaparral or pinon-juniper woodland. The shrub layer can range from intermittent to continuous, and the herbaceous layer is sparse to intermittent (SDMMP 2010). Common species in this vegetation community that were observed include Tecate cypress (*Hesperocyparis forbesii*) and chamise with co-dominant plant species being chaparral pea (*Pickeringia montana*) and San Diego County viguiera (*Bahiopsis lacinata*).

In the southern portion of the project area, 0.36 acres of native grassland were mapped. Common species in this vegetation community that were observed include purple needle grass (*Nassella Stipa* sp.), western blue-eyed grass (*Sisyrinchium bellum*), and clustered tarweed with co-dominant plant species being blue dicks (*Dichelostemma capitatum*), deerweed (*Acmispon glaber*), and filaree (*Erodium* spp.).

Non-Native Vegetation. The middle portion of the project area contains 8.18 acres of non-native grassland/coastal sage scrub. This land cover type was dominated by brome (*Bromus* ssp.) and wild oats with patches of deerweed, California sagebrush, turkey mullein, and western blue-eyed grass, with additional plant species being San Diego goldenstar (*Bloomeria clevelandii*), checkerbloom (*Sidalcea* sp.), and red maids (*Calandrinia menziesii*).

The project area contains 0.06 acres of non-native grassland mapped in the northernmost portion. This land cover type was dominated by brome, radish (*Raphanus sativus*), turkey mullein, wire-lettuce, and sow thistle (*Sonchus* spp.), with co-dominant plant species being checkerbloom, California matchweed (*Gutierrezia californica*), and red maids.

Local Special Status Vegetation Species. Seven special-status plants were mapped within the project area during survey efforts, and a total of nine additional special-status plant species have been documented to occur within 1 mile of the project area, within the Dulzura, Jamul Mountain, and Otay Mountain USGS 7.5-minute quadrangle maps.

Special-status species include species that are listed as endangered or threatened at the Federal or state level, CDFW species of special concern, and City of San Diego MSCP-listed species. Seven special-status species are present within the project area, none of which are federally listed species. Otay manzanita (*Arctostaphylos otayensis*) was observed and mapped within dense chamise chaparral along the middle and southern portions of the project area. San Diego County viguiera (*Bahiopsis lacinata*) was prolific throughout the project area and could be found along disturbed margins of the road and within open areas associated with coastal sage scrub, chamise chaparral,

and southern interior cypress forest. Extensive populations of San Diego goldenstar (*Bloomeria clevelandii*) were mapped within the central portion of the project area, specifically in open non-native grassland/coastal sage scrub habitat. Western dichondra (*Dichondra occidentalis*) was found in rocky outcrops within open areas of chamise chaparral habitat towards the southern portion of the project area. Tecate cypress (*Hesperocyparis forbesii*) formed dense stands within the southern interior cypress forest habitat at the southern terminus of the project area. Munz's sage (*Salvia munzii*) favored the ecotone between chamise chaparral and grassland habitats as well as open chamise chaparral throughout the project area. Ashy spike-moss (*Selaginella cinerascens*) carpeted the understory of the chamise chaparral habitat found throughout the project area.

Rare plant surveys were conducted in the spring and summer of 2019, peak blooming season for perennial herbs and shrubs. No rare plants were observed.

Pesticides. Neither USBP nor its contractors would use herbicides or pesticides for vegetation control for maintenance activities along 1418 Firebreak Road. Therefore, the use of herbicides and pesticides will not be further discussed.

3.4.3 Environmental Consequences

Impacts on vegetation would be considered major and adverse if a large portion of the vegetation community was affected or if the Proposed Action permanently affected the range of a species or population size of a plant community.

3.4.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Short- and long-term, negligible to minor, direct and indirect, adverse effects on vegetation would occur from Alternative 1 due to vegetation clearing, crushing, accidental spills, and temporary increases in turbidity and sedimentation. All maintenance and repair activities would occur within or adjacent to the existing footprint of 1418 Firebreak Road.

Long-term, negligible to minor, adverse impacts would occur from the loss of vegetation during road widening since some areas of vegetation would be converted into parts of the improved road. Some portions of land consisting of currently disturbed areas would be converted into turnouts and passing lanes along the roadway. Maintenance activities would also have the potential to generate dust, therefore covering nearby vegetation. This dust could affect photosynthesis, respiration, transpiration and allow for the penetration of pollutants. However, vegetation control would be limited to the existing footprint and immediately surrounding areas where very little vegetation currently grows. Vegetation clearing could include the selective removal of woody vegetation and could have the potential to result in conversion or degradation of habitat.

Negligible to minor, direct, adverse effects on vegetation, such as crushing, could occur when required vehicles and equipment access, park at, and maneuver around areas requiring maintenance. All maintenance activities are expected to occur within or adjacent to existing footprints of the roadway; as such, these impacts would be negligible to minor.

Degradation of plant communities would also occur if petroleum products or other hazardous materials are accidentally released during the temporary operation and storage of maintenance and repair vehicles and other equipment.

Under this alternative, a long-term, beneficial impact on erosion and sedimentation would occur from the periodic, scheduled inspections and maintenance of roadway. Beneficial impacts would also be expected from the installation of water bars, which would result in the reduced potential for erosion and sedimentation. Adverse impacts on vegetation would be minimized by using appropriate BMPs (see **Appendix G**).

3.4.3.2 Alternative 2: Complete Road Improvement

Short- and long-term, negligible to minor, direct and indirect, adverse effects on vegetation would occur from Alternative 2 due to vegetation clearing, crushing, accidental spills, and temporary increases in turbidity and sedimentation. Impacts from Alternative 2 would be expected to be greater than those from Alternative 1 due to the additional 8,098 ft of roadway slated for improvement. As with Alternative 1, all maintenance and repair activities would occur within or adjacent to the existing footprint of 1418 Firebreak Road.

The likelihood of an accidental spill of petroleum products or other hazardous materials during the operation or storage of maintenance and repair vehicles would be greater with Alternative 2 than Alternative 1, which could lead to further degradation of plant communities. However, all regulatory requirements for handling and storage of fuels, oils, and other hazardous materials would be implemented.

Under this alternative, a long-term, beneficial impact on erosion and sedimentation would occur from the periodic, scheduled inspections and maintenance of roadway. Beneficial impacts of Alternative 2 would be greater than those of Alternative 1 due to the additional 8,098 ft of roadway slated for improvement. Adverse impacts on vegetation would be minimized by using appropriate BMPs (see **Appendix G**).

3.4.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Under Alternative 3, short- and long-term, negligible, direct and indirect, adverse effects on vegetation would occur. CBP would continue to maintain and repair the roadway, although there is a potential for such maintenance and repair activities to occur more frequently under this alternative. All maintenance and repair activities would occur within the existing footprint of 1418 Firebreak Road.

Maintenance and repair under this alternative would result in impacts on vegetation, such as the accidental release of petroleum products or other hazardous materials, trampling and crushing vegetation while accessing the site, and increased erosion, turbidity, and sedimentation.

3.4.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. CBP enforcement actions would be maintained at current levels or diminish over time due to inaccessibility of the area to CBP agents. Therefore, no impacts on vegetation would be expected from the implementation of the No Action Alternative because no maintenance or repair activities would occur in the project area.

3.5 TERRESTRIAL AND AQUATIC WILDLIFE RESOURCES

3.5.1 Definition of the Resource

Terrestrial and aquatic wildlife resources include native or naturalized terrestrial and aquatic animals and the habitats in which they exist. This section includes a description of terrestrial and aquatic wildlife species and their habitats that are likely to be found in the project area. Local special status or rare wildlife species as defined by CNDDB, MSCP, San Diego County Bird Atlas (Unitt 2004), and San Diego County Mammal Atlas (Tremor et al. 2017) are discussed in this section. Federally listed threatened, endangered, and candidate species and California state-listed threatened and endangered wildlife species are addressed in **Section 3.6**.

This section is supported by data gathered during biological surveys conducted from February 2019 through September 2019, and the associated biological survey report (CBP 2020).

3.5.2 Affected Environment

Terrestrial Resources. The proposed project area is capable of supporting various wildlife species, including mammals, birds, reptiles, and amphibians.

One hundred and twelve species of mammals have been documented in San Diego County (Tremor et al. 2017). During biological surveys, only one special-status mammal species, the southern mule deer (*Odocoileus hemionus*), was observed. Southern mule deer are found throughout San Diego County in habitats providing proximity to water and a wide selection of forage. This MSCP species is impacted by a lack of wildlife corridors and has a high potential to occur on site. One additional special-status mammal has a moderate potential to occur within the project area, the Bryant's woodrat (*Neotoma bryanti*). The Bryant's woodrat uses bases of shrubs, cacti, or rock crevices for nesting structures and prefers areas with succulent vegetation for forage, habitat that is abundant in the project area.

Five hundred and twenty-one species of bird have been documented in San Diego County (Unitt 2004). Many of these are migratory birds that do not nest in the area, but still rely on stop over locations to feed and rest during their migration. Seven special-status bird species were documented within the project area during recent surveys: the Northern harrier (*Circus cyaneus*), least Bell's vireo (*Vireo bellii pusillus*), California horned lark (*Eremophila alpestris actis*), coastal California gnatcatcher (*Polioptila californica californica*), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), black-chinned sparrow (*Spizella atrogularis*), and grasshopper sparrow (*Ammodramus savannarum*).

One special-status bird species, the white-tailed kite (*Elanus leucurus*), has a moderate potential to occur within 1 mile of the project area. White-tailed kite require open habitats with adequate vegetative structure to support prey animals, which include grasslands, savannah, woodlands, and wetlands. This species prefers edge habitat with tree structure for nesting with no preference for a specific land cover type. Suitable foraging habitat for this species exists within the open grassland and coastal sage scrub in the project area.

Seventy-nine species of reptiles and amphibians have been documented in San Diego County (SDNHM 2017). During biological surveys, only one special-status reptile species was observed, the San Diegan tiger whiptail (*Aspidoscelis tigris stejnegeri*). In addition, one amphibian and two reptile special-status species have high potential to occur within the project area including the Western spadefoot (*Spea hammondi*), coast horned lizard (*Phrynosoma blainvillii*), and red diamond rattlesnake (*Crotalus ruber*). Meanwhile, four special-status reptile species have moderate potential to occur within the project area including the Southern California legless lizard (*Anniella stebbinsi*), orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), coast patch-nosed Snake (*Salvadora hexalepis virgultea*), and two-striped garter snake (*Thamnophis hammondi*).

Aquatic Resources. No special-status aquatic wildlife, including native or naturalized fish, mollusks, and crustaceans, was identified in the 2019 surveys. However, the project area does contain 14 road pools that have potential suitable habitat for both San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni*). Four of these road pools were found to be occupied by San Diego fairy shrimp during 2019 surveys. Impacts on fairy shrimp are discussed further in **Section 3.6**. No impacts on aquatic resources would be anticipated; therefore, they are not discussed further.

3.5.3 Environmental Consequences

Effects on wildlife would be major and adverse if the species or habitats are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause substantial or permanent reductions in population size or distribution of a species.

3.5.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Short- and long-term, negligible to minor, direct and indirect, adverse effects on wildlife would occur from implementation of Alternative 1. All maintenance and repair activities would occur within or adjacent to the existing footprint of 1418 Firebreak Road. As such, maintenance and repair of the roadway would result in temporary, minor degradation of wildlife habitat and a small amount of permanent habitat loss.

Mechanical vegetation clearing, such as mowing and trimming, could cause larger mammals, reptiles, and birds, including breeding migratory birds, to temporarily relocate. Individuals of smaller, less-mobile species could inadvertently be directly impacted by maintenance and repair activities. Vegetation control would occur within the existing footprint where vegetation is being maintained. As such, impacts from vegetation control would be temporary. The direct disturbance of habitat associated with vegetation clearing, including the selective removal of woody plants, could result in the establishment of invasive plant species in the cleared area resulting in the conversion of habitat.

Localized degradation of habitat would also occur if petroleum products or other hazardous materials are accidentally released during operation or storage of maintenance vehicles and other equipment. However, all regulatory requirements for handling and storage of fuels, oils, and other hazardous materials (such as the development of spill prevention plans) would be implemented. Thus, habitat degradation resulting from accidental releases of hazardous materials would be negligible.

Some wildlife might be killed or injured during ground-disturbing activities or during transportation of equipment and personnel. Ground-disturbing activities would occur within or adjacent to the existing footprint, potentially resulting in animals being killed or injured during planned activities. Burrowing animals, such as the rodents and reptiles, could also be impacted.

Temporary displacement of mobile wildlife from noise and other disturbances associated with Alternative 1 would occur. However, adverse impacts would be minimized by using appropriate BMPs (see **Appendix G**).

3.5.3.2 Alternative 2: Complete Road Improvement

Short- and long-term, negligible to minor, direct and indirect, adverse effects on wildlife would occur from the implementation of Alternative 2. Wildlife could be killed or injured during ground-disturbing activities or during transportation of equipment and personnel. Temporary displacement of mobile wildlife from noise and other disturbances could also be associated with this alternative. As a result, wildlife impacts associated with Alternative 2 would be greater than those associated with Alternative 1 due to the extended construction period and increased distance that accompanies complete road improvement. As with Alternative 1, all maintenance and repair activities would occur within or adjacent to the existing roadway footprint, yet such activities would still result in temporary, minor degradation of wildlife habitat and a small amount of permanent habitat loss.

As with Alternative 1, mechanical vegetation clearing could cause larger mammals, reptiles, and birds to temporarily relocate and individuals of smaller, less-mobile species to be inadvertently directly impacted. In addition, vegetation clearing could result in the establishment of invasive plant species in the cleared area resulting in the habitat conversion. Impacts under Alternative 2 would be greater than those of Alternative 1 due to the extended project area that accompanies complete road improvement.

The likelihood of an accidental spill of petroleum products or other hazardous materials during the operation or storage of maintenance and repair vehicles would be greater with Alternative 2 than Alternative 1 and could lead to localized habitat degradation. All regulatory requirements for handling and storage of fuels, oils, and other hazardous materials (such as the development of spill prevention plans) would be implemented. Thus, habitat degradation resulting from accidental releases of hazardous materials would be negligible. BMPs would be implemented to further minimize these adverse effects.

3.5.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Under Alternative 3, CBP would continue to maintain and repair the roadway and short- and long-term, negligible to minor, direct and indirect, adverse effects on terrestrial wildlife would occur. However, there is the potential for such maintenance and repair activities to occur more frequently. Under this alternative, impacts on wildlife, such as displacement of wildlife, habitat conversion, and degradation from vegetation clearing and the accidental release of petroleum products; crushing of smaller, less-mobile species resulting in death or injury; and disturbance from noise effects and temporary displacement of terrestrial species would be expected. Impacts associated with the implementation of Alternative 3 would be expected to be greater than those of Alternative 1 due to the potential high frequency and volume of maintenance and repair activities.

3.5.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. Therefore, no impacts on terrestrial wildlife would be expected from the implementation of the No Action Alternative because no maintenance or repair activities would occur in the project area. Under this alternative, traffic on the road would continue as normal and it is unlikely that any other entity would maintain the road.

3.6 THREATENED AND ENDANGERED SPECIES

3.6.1 Definition of the Resource

Threatened and endangered species are commonly protected because their historic range and habitat have been reduced and will only support a small number of individuals. Some species have declined for natural reasons, but declines are commonly exacerbated or accelerated by anthropogenic influences. Anthropogenic influences that have contributed to reduced range and habitat availability and reduced populations include agriculture, livestock grazing, urban development and road construction, overcollection, trampling and off-road vehicle use, hydrologic modifications, and altered fire regimes. Once natural vegetation and habitat are disturbed, introduced species can colonize more readily and out-compete native species. Some species occupy specific niches, so even minor alterations are not well-tolerated.

Species listed as threatened or endangered under the ESA (federally listed species) and California Endangered Species Act, as well as designated critical habitat that have the potential to be affected, are discussed in this section. A list of potential threatened, endangered, or candidate species was compiled from USFWS and CDFW. USFWS is responsible for maintaining and tracking a list of Federal threatened, endangered, and candidate species. CDFW is responsible for maintaining a similar list of species for the State of California. In terms of protection and habitat suitability, any species listed as a Federal or state candidate is assessed in a manner as though it has already been listed threatened or endangered. This section presents those Federal- and state-listed species that are known to occur or have the potential to occur within the project area.

3.6.2 Affected Environment

Following biological surveys, it was determined that four federally listed species, the Quino checkerspot butterfly (*Euphydryas editha quino*), coastal California gnatcatcher (*Polioptila californica californica*), least Bell's vireo (*Vireo bellii pusillus*), and San Diego fairy shrimp (*Branchinecta sandiegonensis*), are known to occur within or adjacent to the project area. The coastal California gnatcatcher and Quino checkerspot butterfly occur primarily within the chaparral habitats of the project area, which is atypical for both species. The least Bell's vireo was observed northwest of the project area within riparian woodland habitat. It is expected that the entire project area contains potential habitat for the Quino checkerspot butterfly and coastal California gnatcatcher. These federally listed species are not uniformly distributed among the project area but instead concentrated in areas with preferable habitat.

Three species have critical habitat that overlaps the project area. Least Bell's vireo mapped critical habitat is at the northernmost terminus of 1418 Firebreak Road, at the intersection with Otay Lakes

Road. However, while critical habitat overlaps the project area, no riparian habitat used by least Bell's vireo was observed within the project area. Coastal California gnatcatcher mapped critical habitat is found along the northern portion of 1418 Firebreak Road from the intersection with Otay Lakes Road and continues south approximately 1 mile. Approximately 2.13 acres of coastal California gnatcatcher critical habitat is found within the project area. Quino checkerspot butterfly mapped critical habitat encompasses the northern terminus and middle section of 1418 Firebreak Road, for a total of approximately 1 mile. Approximately 4.64 acres of Quino checkerspot butterfly critical habitat is found within the project area. **Figure 3-1** depicts all critical habitat within the project area.

3.6.2.1 Terrestrial Threatened and Endangered Species

Quino checkerspot butterfly. The Quino checkerspot butterfly is a small butterfly in the brush-footed butterfly family (Nymphalidae). The species is one of at least 18 California subspecies of the more widespread Edith's checkerspot. Adults fly once per year from late February to mid-April. Threats to the Quino checkerspot include agriculture and urban development, conversion of native habitats, fire management practices, and grazing.

Historically, the Quino checkerspot butterfly was found from the Santa Monica Mountains south into northern Baja California. The Quino checkerspot butterfly is found in areas with open canopies of coastal sage scrub, open chaparral, juniper woodland, and native grasslands. The species habitat contains open areas and low-growing, sparse vegetation, with a low to moderate amount of non-native species (USFWS 2003). Food plants used by Quino checkerspot larva is restricted to dot-seed plantain (*Plantago erecta*), wooly plantain (*P. patagonica*), possibly desert Indianwheat (*P. ovata*), purple owl's clover (*Castilleja exserta*), Coulter's snapdragon (*Antirrhinum coulterianum*), bird's beak (*Cordylanthus rigidus*), and Chinese houses (*Collinsia* spp.) (USFWS 2003, Mattoni et al. 1997).

There is suitable habitat for the Quino checkerspot butterfly within the project area, because there are habitats with appropriate structure, species makeup, and host plants present within the surrounding area. During the 2019 surveys, a total of 25 Quino checkerspot butterflies were observed in or around the project area.

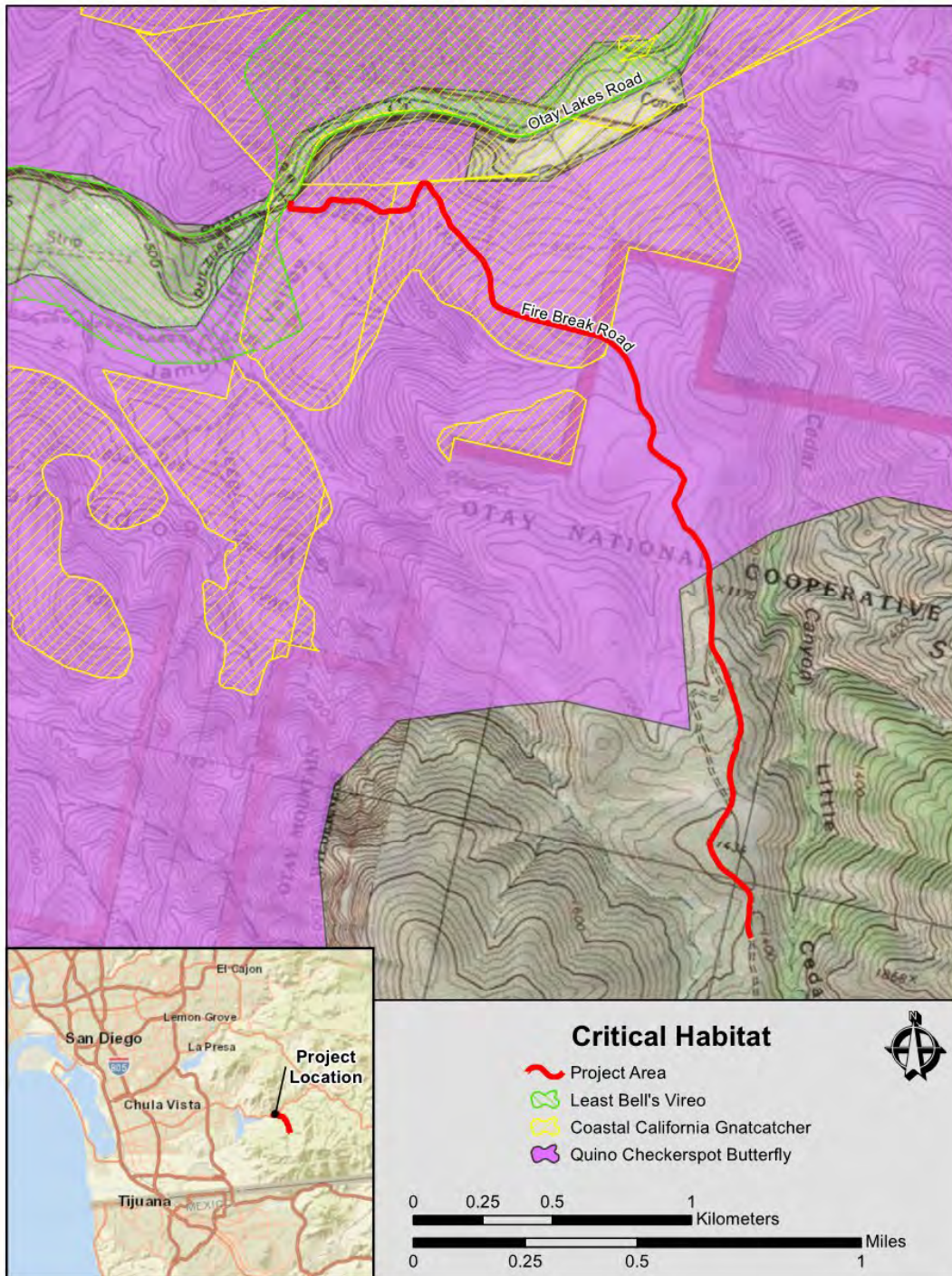


Figure 3-1. Critical Habitat

The following measures would be implemented to minimize impacts to Quino checkerspot butterflies:

1. A designated biological monitor would be present during all road improvement activities to minimize impacts to Quino checkerspot butterfly and associated larval host plants.
2. For permanent impacts to Quino checkerspot butterfly habitat as a result of the Proposed Action, a mitigation ratio of 2:1 has been proposed to address impacts, through a combination of closure of excess access roads and habitat restoration. CBP has identified five roads in the vicinity of 1418 Firebreak Road on California Department of Fish and Wildlife (CDFW) and USFWS San Diego National Wildlife Refuge (SDNWR) land that may be closed to create Quino checkerspot butterfly habitat, with approval from CDFW and USFWS. A total of 12,675 linear feet are available to meet the 9,770 linear feet required for mitigation. The following tasks are recommended to support road closure activity:
 - a. Survey the roads proposed for closure and map surrounding Quino checkerspot butterfly habitat and erosion conditions.
 - b. Stop access to the roads by constructing a vehicle barrier (barrier should visually fit into the context of the National Wildlife Refuge. The barrier may need to extend as much as 150' either side of the closed road to prevent people going around the barrier) similar to a buck and rail or split rail fence placed at 8 locations (length will vary).
 - c. Prepare a Mitigation Management Plan for the road closure, addressing any erosion issues. Included in the Plan would be a map of treatment area locations and dimensions by type and a full description of treatment types. Current conditions can be mapped into four categories:
 - High quality Quino checkerspot butterfly habitat,
 - Native habitat but low quality Quino checkerspot butterfly habitat,
 - Combined native and non-native habitat, and
 - Non-native habitat, i.e. non-native grassland.
 - d. Prepare a Mitigation Management Plan, detailing each treatment depending on the habitat quality in the roads:
 - High quality Quino checkerspot butterfly habitat would require no actions except for monitoring.
 - Native habitat but low quality Quino checkerspot butterfly habitat would be treated by creating pockets for hill topping opportunities that may involve removing some cover and opening up clearings by removing shrubs.

- Combined native and non-native habitat would be treated by hand removal of exotics and using the removals to create clearings for hill topping or seeding of host plants and possible planting of flat-topped buckwheat (*Eriogonum fasciculatum*).
 - Non-native habitat would be treated by herbicide or mechanical removal to control non-native species, followed by seeding with host plant species and possible planting of flat-topped buckwheat.
- e. Commence a five-year maintenance and monitoring period after the mitigation is installed to ensure success of treatment, remove any non-native cover, and monitor shrub canopy cover. Maintenance and monitoring would be taken over by land managers after success criteria established in the Plan have been met and not to exceed a specified period.

Coastal California gnatcatcher. The coastal California gnatcatcher has a limited range within the United States. This subspecies is restricted to coastal Southern California and northwestern Baja California, Mexico, from Ventura and San Bernardino counties, California, south to approximately El Rosario, Mexico (American Ornithologists' Union 1957, Atwood 1991, Garrett and Dunn 1981). The subspecies exists predominantly in Southern California's coastal sage scrub habitat, with a strong preference towards areas dominated by California sagebrush (*Artemisia californica*), chaparral broom (*Baccharis sarothroides*), and California buckwheat (*Eriogonum fasciculatum*). The majority of plant species found in coastal sage scrub habitat are low-growing, drought deciduous shrubs and sub-shrubs (USFWS 1997). Densities are highest along sage scrub-grassland borders or in relatively open sage scrub habitat. Nesting occurs in a variety of host shrub species, with a high depredation rate, which results in frequent replacement clutches throughout the breeding season. The coastal California gnatcatcher is non-migratory (Unitt 2004) and generally avoids crossing even small areas of unsuitable habitat (Atwood and Bolsinger 1992). The species is typically observed on dry coastal slopes, washes, and mesas, in areas with low plant growth of approximately 1 meter (3 ft.) in height (NatureServe 2019). These areas such as in this project footprint can also include low-growing chaparral instead of the more common coastal sage scrub association.

The project area contains suitable coastal sage scrub habitat, dominated by California sagebrush and flat-top buckwheat. During the spring 2019 surveys, multiple coastal California gnatcatchers were detected within the region of analysis, but not within the coastal sage scrub areas. Instead, both observations were within or along the edge of the low growing chaparral areas. This species occurs within the project area and was observed during the 2019 surveys. There is critical habitat for the coastal California gnatcatcher in the northern portion of the project area.

The following measures would be implemented to minimize impacts to Coastal California gnatcatchers:

1. Conduct pre-construction nest surveys if construction is between February 15 and August 15, to determine if coastal California gnatcatcher are nesting within 300 feet of construction activities.

2. A designated biological monitor would be present during all road improvement activities to minimize impacts to coastal California gnatcatcher.
3. If a nest is found, established either an 8-foot tall plywood sound wall as far from the nest as possible, but no less than 50 feet between construction and the nest, or conduct sound analysis and monitoring to demonstrate that noise does not exceed 60 Db sustained for an hour at the nest site during project activities.
4. Avoid impacts to areas of perennial vegetation to the extent practicable. Where vegetation impacts cannot be avoided salvage overstory shrubs and stockpile the top 6 inches of topsoil and any grubbed vegetation stockpiled to assist in revegetation.
5. For permanent impacts to coastal California gnatcatcher habitat as a result of the Proposed Action, a mitigation ration of 2:1 has been proposed to address impacts, achieved through restoration of 0.1-acre of coastal sage scrub habitat within disturbed roadways identified by USFWS.

Least Bell's vireo. This subspecies of Bell's vireo is a neotropical migrant and summer resident in California and northern Baja California, wintering in southern Baja California (Brown 1993). This vireo was once common in lowland riparian habitats throughout California but declined precipitously during the 20th Century. By the time of Federal listing in 1986, an estimated 300 pairs were restricted to Southern California, primarily in San Diego County (USFWS 1998). The population has increased since, with the number of nesting territories in California in 2006 estimated to be approximately 10 times greater than in 1986. However, the distribution of the vireo at that time remained almost entirely within Southern California (USFWS 2006).

Least Bell's vireo breeding habitat consists of riparian vegetation, usually in an early successional state, between 5 and 10 years old. Such habitat is preferred by least Bell's vireo because it provides dense cover in the lower shrub layer for nest concealment, as well as a stratified canopy structure favorable to insect abundance, and thus vireo foraging. Riparian habitat types used for breeding include those dominated by willows (*Salix* sp.), Fremont's cottonwood (*Populus fremontii*), and/or oaks (*Quercus* sp.), with a dense understory of species, such as willows, mulefat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*), and mugwort (*Artemisia douglasiana*) (USFWS 1998). Nests are typically placed within 3 ft of the ground. Least Bell's vireo could attempt multiple broods during the breeding season from mid-March to late September, although one brood is typical (Brown 1993). Habitats such as chaparral and coastal sage scrub adjacent to riparian areas are used for foraging and even nesting, and thus provide another potentially important habitat component (Kus and Miner 1989). Along with habitat destruction, brood parasitism by the brown-headed cowbird (*Molothrus ater*) is widely considered a major contributor to the decline of least Bell's vireo, and a continuing challenge to its recovery.

The project area does not contain suitable nesting or foraging riparian habitat for least Bell's vireo, and none have been detected immediately within the project area during survey efforts. However, occupied habitat for this species does exist nearby, within the Otay River Riparian corridor approximately 100 ft north of the northern terminus of the project area. This species does not occur within the project survey area but was heard by surveyors in the riparian areas described.

3.6.2.2 Aquatic Threatened and Endangered Species

San Diego fairy shrimp. San Diego fairy shrimp are small aquatic invertebrates, generally restricted to vernal pools and other ephemeral basins within coastal Southern California coastal sage scrub and chaparral upland habitat. Claypan and hardpan pools provide suitable pools, which generally fill for a short time in the winter and are dry in the summer (Eriksen and Belk 1999). The San Diego fairy shrimp is a habitat specialist that is found in shallower pools up to 12 inches deep. Fairy shrimp feed on a variety of algae, diatoms, and particulate organic matter (USFWS 2007). San Diego fairy shrimp hatch following rainfall in suitable vernal pool habitat and mature within 7–14 days. Individuals are usually seen from January to March, although observations of the species could fall outside this range during early or late rainfall events. Cysts of the species can withstand prolonged dry periods and often form cyst banks in pool soils. These cyst banks allow for the recolonization of habitat in subsequent years (USFWS 2007).

San Diego fairy shrimp was described as a species in 1993 (Fugate 1993). Critical habitat for San Diego fairy shrimp was designated on December 12, 2007 (USFWS 2007). The species is currently covered under the Vernal Pools of Southern California Recovery Plan issued on September 3, 1998.

The project area falls within the known range of San Diego fairy shrimp, and while there are no vernal pools within the surrounding areas, there are road pools in the access road that could have ponding long enough for fairy shrimp from nearby pools to colonize and use. No critical habitat for the species is within the project area. During biological surveys, San Diego fairy shrimp were observed in ephemeral basins (roadside pools of water) within low areas of 1418 Firebreak Road. Protocol fairy shrimp surveys are complete for the 2020 winter/spring season.

The following measures would be implemented to minimize impacts to San Diego fairy shrimp:

1. For impacts to road pools supporting San Diego fairy shrimp as a result of the Proposed Action, a mitigation ration of 3:1 has been proposed given the lack of surrounding vernal pool habitat and the disturbed quality of the road pools.
2. Mitigation will be achieved through vernal pool restoration and enhancement and conservation at Arnie's Point Vernal Pool Restoration Area within Immigration and Naturalization Service (INS) property on Otay Mesa. Mitigation efforts will include:
 - a. Placement of conserved vernal pool and associated watershed habitat into a conservation easement.
 - b. Preparation of a Vernal Pool Enhancement and Monitoring plan for approval by USFWS.

Riverside fairy shrimp. Suitable habitat for Riverside fairy shrimp includes vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats. Riverside fairy shrimp are considered habitat specialists and differ from San Diego Fairy Shrimp in habitat use because they are found in moderate-to-deep pools (generally ranging from 10 inches to 10 ft in depth), longer-lived vernal pools, and ephemeral wetlands. Riverside fairy shrimp do not occur in riverine or marine waters or other permanent bodies of water. Restrictive soil layers are typically

hardpan or claypan, and bedrock types are volcanic mud or lava flows. Other kinds of depressions that hold water of a similar volume, depth, and area, and for a similar duration and seasonality as vernal pools and ponded areas within swales could also provide potential habitat for Riverside fairy shrimp. Riverside fairy shrimp habitat is limited to non-vegetated ephemeral and vernal pool systems, which are generally large, and are found within chaparral and coastal sage scrub habitats from 100 to 1,300 ft in elevation. The most common unifying feature of Riverside fairy shrimp habitat, in general, is an ephemerally wet, flooded, or ponded area that is typically wet during a portion of the year and dry for the remainder of the year. A minimum period of inundation, or pool duration, that Riverside fairy shrimp need to hatch and reach sexual maturity is approximately 8 weeks.

Soils and soil series that underlie vernal pool habitat supporting Riverside fairy shrimp are generally characterized by a high content of coarse sandy grains (marine alluvial sediments), loams, or clay inclusions, or a combination of these, with a subsurface clay or hardpan layer. These are also limited in number and geographically fixed.

Riverside fairy shrimp was described as a species in 1990 (Eng et al. 1990) and was listed as federally endangered on August 3, 1993. Critical habitat for Riverside fairy shrimp was designated on May 30, 2001 (USFWS 2008) and revised on December 4, 2012 (77 FR 72069-72140). Riverside fairy shrimp is currently covered under the Vernal Pools of Southern California Recovery Plan, issued on September 3, 1998.

The project area falls within the known range of Riverside fairy shrimp, and while there are no vernal pools within the surrounding areas, there are ephemeral drainages nearby that could have ponding long enough for fairy shrimp from nearby pools to colonize and use. No critical habitat for the species is within the project area. During biological surveys, Riverside fairy shrimp were not observed near 1418 Firebreak Road. Protocol fairy shrimp surveys are complete for the 2020 winter/spring season.

3.6.3 Environmental Consequences

Effects on threatened and endangered species would be major and adverse if the species or habitats are adversely affected over relatively large areas, or if any of the following occur:

- Permanent loss of occupied, critical, or another suitable habitat,
- Temporary loss of critical habitat that adversely affects recolonization by threatened or endangered benthic resources, and
- Take (as defined under the ESA) of a threatened or endangered species.

3.6.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Quino checkerspot butterfly. Short- and long-term, moderate to major, direct and indirect, adverse effects from construction activities on the Quino checkerspot butterfly would be expected. It is possible that ground-disturbing activities associated with Alternative 1 could affect breeding practices. Surveys in 2019 also revealed the presence of Quino checkerspot butterfly host and food

plants within the proposed disturbance area. Surveys found that an estimated 1.75 acres of Quino checkerspot butterfly habitat would be impacted with the implementation of Alternative 1. Overall, surveys revealed a high-quality potential habitat for the species due to its isolation, presence of host plants, and topographical features (openings, hilltops, roadbed). Although BMPs would likely minimize direct impacts on Quino checkerspot butterflies, indirect effects from the potential loss of host and food plants would occur.

If ground clearing occurs during the active period for Quino checkerspot butterflies (February–mid-May, depending on weather), there is a potential to impact adult Quino checkerspot butterflies. If adult Quino checkerspot butterflies forage within the proposed disturbance area during construction, they could potentially be run over or hit by construction vehicles. Furthermore, during construction, impacts from construction such as fugitive dust emissions and human activity could displace or kill Quino checkerspot butterflies.

Recently disturbed soils can increase the potential for invasive species, such as Lehman's lovegrass and false-brome, to become established. These and other invasive species tend to form dense stands that out-compete larval host species and nectar-providing species resulting in degraded habitat. The Quino checkerspot butterfly occurs in open areas with low-growing and sparse vegetation that are typically formed or maintained by some form of disturbance. Most of the vegetation-control activities would be limited to the landscaped vegetation within the proposed 1418 Firebreak Road. Outside of the proposed disturbance area, vegetation control would be limited to the minimum extent necessary to create defensible space for wildfires.

While it is possible to avoid impacts on Quino checkerspot butterfly individuals with the implementation of mitigation measures and BMPs, the avoidance of host and food plants also found in the project area would likely be inevitable. In addition, the USFWS considers any area within 0.6 miles (estimated movement distance) of a known Quino checkerspot butterfly observation to be occupied habitat. Therefore, Alternative 1 could affect this habitat and is likely to adversely affect Quino checkerspot butterfly.

BMPs would be implemented to minimize these direct and indirect effects on Quino checkerspot butterfly adults, eggs, and larvae, in the unlikely event they occur within the proposed disturbance area. Effects could include injury or crushing of individuals during site preparation and by use of construction equipment. Indirect effects could also occur from fugitive dust emissions, increased invasive species, and loss of habitat from site-preparation activities.

Coastal California gnatcatcher. Short- and long-term, direct and indirect, negligible, adverse effects on the coastal California gnatcatcher would be expected. Surveys conducted in 2019 indicated one pair of coastal California gnatcatchers were present either near or within the project area throughout the duration of the survey period. One pair and three juveniles were observed outside of the protocol survey period when a biologist was conducting a rare plant survey within the same survey area. It is possible that activity associated with Alternative 1 could affect species breeding. BMPs would be implemented to avoid or minimize these direct and indirect effects to a level that is negligible.

Noise, fugitive dust, and human activity, which could result from improvement activities to 1418 Firebreak Road, could cause coastal California gnatcatchers to avoid areas in which they might

otherwise forage or nest. Any temporary “loss” (due to avoidance by gnatcatchers) of forage and nesting habitat would be reduced or eliminated by implementing BMPs. Effects on coastal California gnatcatchers would be negligible.

Least Bell’s vireo. Short- and long-term, direct and indirect, negligible, adverse effects on the least Bell’s vireo would be expected. Based on the lack of the riparian habitat for least Bell’s vireo nesting, it is unlikely that the species would occur within the project area and the species was not observed during the 2019 surveys. However, occupied habitat does exist nearby, within the Otay River Riparian corridor. At this distance, there would be the potential for short-term noise impacts at the proposed staging area. Noise impacts on wildlife are discussed further in **Section 3.11**. BMPs would be implemented to avoid or minimize these direct and indirect effects to a level that is negligible.

San Diego fairy shrimp. Short- and long-term, direct and indirect, moderate to major, adverse effects on San Diego fairy shrimp would be expected. San Diego fairy shrimp are obligate vernal pool inhabitants and require rainwater that collects in depressions to survive (USFWS 2008). While no vernal pools are present in the project area, there are road pools in the access road that could have been ponding long enough for fairy shrimp from nearby pools to colonize and use. During biological surveys, San Diego fairy shrimp were observed in ephemeral basins within low areas of 1418 Firebreak Road. Habitat destruction would be a direct impact on the species due to construction and maintenance activities. BMPs would be implemented to avoid and minimize these direct and indirect effects to a negligible level.

Riverside fairy shrimp. No direct or indirect impacts on Riverside fairy shrimp are expected. Riverside fairy shrimp, similar to San Diego fairy shrimp, are obligate vernal pool inhabitants and require rainwater that collects in depressions to survive (USFWS 2008). During biological surveys, Riverside fairy shrimp were not observed near 1418 Firebreak Road. Protocol fairy shrimp surveys are complete for the 2020 winter/spring season and presence of Riverside fairy shrimp has not been confirmed to date. Therefore, Alternative 1 is not likely to impact this species.

3.6.3.2 Alternative 2: Complete Road Improvement

Quino checkerspot butterfly. Short-term, direct and indirect, minor to moderate, adverse effects from construction activities on the Quino checkerspot butterfly would be expected from implementing Alternative 2. As with Alternative 1, it is possible that activity associated with Alternative 2 could affect species breeding. Although BMPs would likely minimize direct impacts on Quino checkerspot butterflies, indirect effects from the potential loss of host and food plants would occur. Impacts due to the implementation of Alternative 2 would be expected to be greater than Alternative 1 because construction would take place over a longer period of time and within a larger geographical area. Surveys found that an estimated 4.32 acres of Quino checkerspot butterfly habitat would be impacted with the implementation of Alternative 2.

Coastal California gnatcatcher. Short-term, direct and indirect, negligible, adverse effects on the coastal California gnatcatcher would be expected with the implementation of Alternative 2. As with Alternative 1, it is possible that activity associated with Alternative 2 could affect species breeding. Impacts due to the implementation of Alternative 2 would be expected to be greater than Alternative 1 as construction would take place over a longer period of time and within a larger

geographical area. As with Alternative 1, BMPs would be implemented to avoid and minimize these direct and indirect effects to a level that is negligible.

Least Bell's vireo. Short-term, direct and indirect, negligible, adverse effects on the least Bell's vireo would be expected with the implementation of Alternative 2. Similar to Alternative 1, there would be the potential for noise impacts on the species at the proposed staging area. Implementation of Alternative 2 would be expected to cause a greater impact on the species due to the extended construction period resulting in noise being produced over a longer duration. As with Alternative 1, BMPs would be implemented to avoid and minimize these direct and indirect effects to a negligible level.

San Diego fairy shrimp. Short-term, direct and indirect, minor to moderate, adverse effects on San Diego fairy shrimp would be expected with the implementation of Alternative 2. Habitat destruction caused by this alternative would be expected to be greater than Alternative 1 due to the larger disturbance area, resulting in a higher potential of habitat being encountered. As with Alternative 1, BMPs would be implemented to avoid and minimize these direct and indirect effects to a negligible level.

Riverside fairy shrimp. Similar to Alternative 1, no direct or indirect impacts on Riverside fairy shrimp are expected with the implementation of Alternative 2.

3.6.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Quino checkerspot butterfly. Short-term, direct and indirect, minor to moderate, adverse effects from repair activities on the Quino checkerspot butterfly would be expected to occur with the implementation of Alternative 3. As with Alternative 1, it is possible that activity associated with Alternative 3 could affect species breeding. Impacts due to the implementation of Alternative 3 would be expected to be greater than Alternative 1 due to the potential for a high frequency of maintenance and repair activities. Surveys found that an estimated 1.11 acres of Quino checkerspot butterfly habitat would be impacted with the implementation of Alternative 3.

Coastal California gnatcatcher. Short-term, direct and indirect, negligible, adverse effects on the coastal California gnatcatcher would be expected with the implementation of Alternative 3. As with Alternative 1, it is possible that activity associated with Alternative 3 could affect species breeding. Impacts due to the implementation of Alternative 3 would be expected to be greater than Alternative 1 due to the potential for a high frequency of maintenance and repair activities.

Least Bell's vireo. Short-term, direct and indirect, negligible, adverse effects on the least Bell's vireo would be expected with the implementation of Alternative 3. Similar to Alternative 1, there would be the potential for noise impacts on the species. Implementation of Alternative 3 would be expected to cause a greater impact on the species due to the potential for a high frequency of maintenance and repair activities.

San Diego fairy shrimp. Short-term, direct and indirect, minor to moderate, adverse effects on San Diego fairy shrimp would be expected with the implementation of Alternative 3. Habitat destruction caused by this alternative would be expected to be similar to Alternative 1 as Alternative 3 would follow the same maintenance and repair schedule as Alternative 1.

Riverside fairy shrimp. Similar to Alternative 1, no direct or indirect impacts on Riverside fairy shrimp are expected with the implementation of Alternative 3.

3.6.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. CBP would continue to use the existing two-track 1418 Firebreak Road. No impacts on threatened or endangered species would be expected.

3.7 HYDROLOGY AND GROUNDWATER

3.7.1 Definition of the Resource

Evaluation of hydrology requires a study of the occurrence, distribution, and movement of water, and its relationship with the environment. Many factors affect the hydrology of a region, including natural precipitation and evaporation rates and outside influences such as groundwater withdrawals. Groundwater is a subsurface hydrologic resource and it recharges surface water. It is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. In California, groundwater use is managed by the CDWR.

3.7.2 Affected Environment

Climate and Hydrology. The project area occurs within the Mediterranean Division – California Coastal Sage, Chaparral, and Oak Woodland Province (Bailey 1995). Regional climate is defined by hot, dry summers and rainy, mild winters with annual temperatures ranging from 55°F to 71°F. Average low temperatures range from 45°F in December to 66°F in August. Average high temperatures range from 67°F in December to 78°F in August. The record low and record high temperatures for the region are 22°F and 96°F, respectively (NOAA 2019; U.S. Climate Data 2019). Average precipitation totals 9.81 inches per year. The elevation of the project area ranges from 525 ft above mean sea level (AMSL) at the northern terminus of 1418 Firebreak Road to 1,435 ft AMSL at the southern terminus. (Google Earth 2019).

Much of the region is dominated by the chaparral climax association, which forms a mosaic across the region. A wide variety of wildlife use this province, especially birds, for whom coastal California constitutes a major migration route. Threatened and endangered species also use habitat near the project area and are subject to regional protection plans.

Groundwater. The aquifers in Southern California are classified by the USGS as either coastal basin aquifers or basin and range aquifers (USGS 1995). Coastal basin aquifers are partly filled with marine sedimentary rocks that were deposited during periodic encroachment of the sea, and with terrestrial deposits consisting of weathered igneous and sedimentary rock material, which was transported into the basins via mountain streams. Most of the fresh water is contained in aquifers consisting of sand and gravel terrestrial deposits and confining units of fine-grained material like silt and clay. Water enters coastal basin aquifers primarily when runoff from precipitation in the surrounding mountains infiltrates the permeable sediments of the valley floor. Some direct recharge is provided by precipitation falling on the valley floor, but most of the precipitation

evaporates or is transpired by plants. Water can also enter the aquifer system as lateral subsurface flow from an adjacent basin; however, basin and range aquifers are not continuous because of the complex faulting in the region.

There are four aquifer types collectively known as basin and range aquifers, volcanic-rock aquifers, carbonate-rock aquifers, and basin-fill aquifers. Any combination of the four aquifers could be in, or below, any basin and constitute four separate sources of water; or they might be hydraulically connected and form a single source. The aquifers are formed from volcanic and carbonate rocks and unconsolidated to consolidated basin-fill deposits. The basin-fill deposits are the most productive aquifers and are generally found in internally drained individual alluvial basins, which are separated by low mountains (USGS 1995). Most of these basins are small, generally averaging less than 10 square miles in area.

The U.S./Mexico international border in California is composed of the South Coast and Colorado River hydrologic regions. Within the San Diego area of the South Coast hydrologic region, there are 27 groundwater basins covering 277,000 acres. Groundwater is found in unconfined alluvial aquifers in most of the basins and has local impairments of nitrate, sulfate, and total dissolved solids (CDWR 2003). The Colorado River hydrologic region covers approximately 13 million acres in southeastern California, with 64 groundwater basins or subbasins. Within the Colorado River hydrologic region lies the Imperial Valley Groundwater Basin. This basin is approximately 1,870 square miles in southeastern California along the U.S./Mexico international border, and is the primary aquifer in the project area. It is bounded to the north by the Salton Sea, which is also its discharge point. The Imperial Valley Groundwater Basin is composed of an upper and lower aquifer, which are separated by a semi-permeable aquitard. Recharge comes from irrigation return, rainfall and surface runoff percolation, and seepage from unlined canals, such as the Coachella and All-American canals. Water quality varies in the basin, but it is generally unusable for domestic or irrigation purposes unless it is treated first, since it has high levels of dissolved solids, fluoride, and boron. Many of the water quality issues can be attributed to recharge provided by the highly polluted New River, which drains the Mexicali Valley (CDWR 2003).

3.7.3 Environmental Consequences

The Proposed Action would be considered to cause a major adverse impact on hydrology or groundwater if it were to substantially affect water quality; substantially reduce water availability or supply to existing users; threaten or damage hydrologic characteristics; or violate established Federal, state, or local laws and regulations.

3.7.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Climate and hydrology. No impacts on climate and hydrology with respect to the ecoregions or precipitation regime would be anticipated with the implementation of Alternative 1. Climate and hydrologic cycles are large-scale processes that affect local areas; however, a significant contribution of greenhouse gas (GHG) emissions or alteration to the existing topography, vegetation, or precipitation regime would be required to modify climate or hydrology. Those large-scale changes would not occur with this project.

Groundwater. Short-term, negligible, indirect, adverse impacts could occur on groundwater from vegetation clearing and debris removal, which could cause the deposition of fill materials or increased erosion into groundwater recharge areas. Long-term, negligible to minor, indirect, beneficial impacts on groundwater could occur from a decrease in erosion because roadways would be properly maintained with the installation of water bars, which would reduce the effects incurred from negligence, such as washout and long-term sedimentation.

Maintenance and repair of the road could lead to short-term, minor, adverse, impacts on groundwater because grading and other ground-disturbing activities would result in erosion and sedimentation. In addition, maintenance and repair activities could require the clearing of vegetation and rock, which could alter the flow of water and percolation of precipitation into the ground, resulting in a long-term, negligible, adverse impact on groundwater recharge.

Rutting can occur along graded earth and sand roads, which is exacerbated by rain events that further erode the surface. Unmanaged stormwater flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable. Maintenance and repair of the existing road would have short- and long-term, minor to moderate, beneficial impacts on groundwater by minimizing erosion of potentially contaminated (e.g., oils, metals) road material into groundwater recharge areas. Improper maintenance could result in short-term, negligible to minor, direct and indirect, adverse impacts on groundwater by increasing erosion or introducing fill material into groundwater recharge areas.

All necessary erosion-control BMPs (see **Appendix G**) would be adopted to ensure stabilization of the project area. All of the standards CBP is adopting are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resource agencies.

3.7.3.2 Alternative 2: Complete Road Improvement

Climate and hydrology. As with Alternative 1, no impacts on climate and hydrology with respect to the ecoregions or precipitation regime would be anticipated.

Groundwater. Short-term, negligible, indirect, adverse impacts could occur on groundwater from vegetation clearing and debris removal as with Alternative 1. Long-term, negligible to minor, indirect, beneficial impacts on groundwater could occur from a decrease in erosion because roadways would be properly maintained. Impacts associated with Alternative 2, both beneficial and adverse, would be expected to be greater than those impacts associated with Alternative 1 due to the greater disturbance and change associated with a complete road improvement. Under Alternative 1, 4,885 linear feet of roadway would be impacted while 12,983 linear feet of roadway would be impacted with the implementation of Alternative 2.

As with Alternative 1, maintenance and repair of the roadway could lead to short-term, minor, adverse, impacts on groundwater because grading and other ground-disturbing activities would result in erosion and sedimentation. Although, long-term, minor beneficial impacts on groundwater would occur through properly maintained roads. These impacts associated with Alternative 2 would be expected to be greater than those impacts associated with Alternative 1 due to the greater disturbance and change associated with a complete road improvement. Maintenance

and repair of the existing roadway would be in accordance with proven maintenance and repair standards. All necessary erosion-control BMPs would be adopted to ensure stabilization of the project areas.

3.7.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Climate and hydrology. As with Alternative 1, no impacts on climate and hydrology with respect to the ecoregions or precipitation regime would be anticipated.

Groundwater. Short-term, negligible to minor, indirect, adverse impacts could occur on groundwater from vegetation clearing and debris removal. Impacts associated with Alternative 3 would be expected to be greater than those impacts associated with Alternative 1 because maintenance and repair activities would likely occur at higher frequencies.

As with Alternative 1, maintenance and repair of the roadway could lead to short-term, minor, adverse, impacts on groundwater because ground-disturbing activities would result in erosion and sedimentation. Impacts associated with Alternative 3 would be expected to be greater than those impacts associated with Alternative 1 because maintenance and repair activities would occur more often.

3.7.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, short- and long-term, minor, direct and indirect, adverse impacts on hydrology and groundwater would be anticipated as maintenance and repair activities would not be implemented. Therefore, the degrading roadway could increase flood risk. Changes in hydrology from clogged drainage structures could occur, which could reduce the potential for groundwater recharge in the area. Impacts on hydrology and groundwater under the No Action Alternative would be anticipated to be greater than impacts for Alternative 1 because unlike Alternative 1, mitigation measures for stormwater drainage would not be implemented under the No Action Alternative.

3.8 SURFACE WATERS AND WATERS OF THE UNITED STATES

3.8.1 Definition of the Resource

Surface water resources generally consist of wetlands, lakes, rivers, and streams. All of these surface water components contribute to the economic, ecological, recreational, and human health of a community.

Waters of the United States are defined within the CWA, and jurisdiction is addressed by the U.S. Environmental Protection Agency (USEPA) and the USACE. These agencies assert jurisdiction over traditional navigable waters and their relatively permanent tributaries, and the wetlands that are adjacent to these waters (USEPA 2010a). The California State Water Resources Control Board, through the appropriate RWQCB, regulates activities pursuant to Section 401 and Section 402 of the CWA (USEPA 2016) within California.

The CWA establishes the basic structure for regulating discharges of pollutants into the Waters of the United States (USEPA 2010b), with the objective of restoration and maintenance of chemical,

physical, and biological integrity of the Nation's waters (USEPA 2010a). To achieve this objective, several goals were enacted, including (1) eliminate discharge of pollutants into navigable waters by 1985; (2) achieve water quality that provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water by 1983; (3) prohibit the discharge of toxic pollutants in toxic amounts; (4) provide Federal financial assistance to construct publicly owned waste treatment works; (5) develop and implement the national policy that area-wide waste treatment management planning processes ensure adequate control of sources of pollutants in each state; (6) enforce the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into navigable waters, waters of the contiguous zone, and the oceans; and (7) establish the national policy that programs be developed and implemented in an expeditious manner to enable the goals to be met through the control of both point and nonpoint sources of pollution.

The USACE regulates the discharge of dredged and fill material (e.g., concrete, soil, cement block, gravel, sand) into Waters of the United States including adjacent wetlands under Section 404 of the CWA (USEPA 2010b) and work on structures in or affecting navigable Waters of the United States under Section 10 of the Rivers and Harbors Act of 1899 (USEPA 2010c).

Wetlands and riparian habitats are ecologically important communities that provide many benefits for people, fish, and other wildlife. They provide key habitat for a wide array of plant and animal species, including resident and migrating birds, amphibian and fish species, mammals, and insects. Vegetation production and diversity are usually very high in and around these sites, with many plant species adapted only to these unique environments. In addition, wetlands and riparian zones provide a variety of hydrologic functions vital to ecosystem integrity. They protect and improve water quality by storing floodwaters, recharging groundwater, and filtering out nutrients and chemicals (USEPA 2001a). Development and conversion of wetlands and riparian zones affects wildlife diversity, carrying capacity, and hydrologic regime. More than 220 million acres of wetlands are estimated to have existed in the lower 48 states in the 1600s. More than half of those wetland acres have been drained or converted to other uses, with the most impacts occurring in the 1950s to 1970s. Approximately 60,000 acres of wetlands are still lost annually, primarily from conversion for agriculture and other development purposes (USEPA 2001b).

Wetlands are a protected resource under E.O. 11990, *Protection of Wetlands*, issued in 1977 “to avoid to the extent possible the short- and long-term, adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.” Wetlands have been defined by agencies responsible for their management. The term “wetland,” used herein, is defined using USACE conventions. The USACE has jurisdiction to protect wetlands under Section 404 of the CWA that are defined as “. . . areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[b]).

Three diagnostic characteristics must be met to classify an area as a wetland: (1) more than 50 percent of the dominant vegetation species present must be classified as obligate (species that are found greater than 99 percent of the time in wetlands), facultative wetland (species that are found 67 to 99 percent of the time in wetlands), or facultative (species that are found 34 to 66 percent of the time in wetlands); (2) the soils must be classified as hydric; and (3) the area is

either permanently or seasonally inundated, or saturated to the surface at some time during the growing season of the prevalent vegetation (USACE 1987).

Wetlands are protected as a subset of “the Waters of the United States” under Section 404 of the CWA. The term “Waters of the United States” has a broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats, including wetlands. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill materials into the Waters of the United States, including wetlands. In addition, Section 404 of the CWA also grants states with sufficient resources the right to assume these responsibilities. Section 401 of the CWA gives the state board and regional boards the authority to regulate through water quality certification any proposed federally permitted activity that could result in a discharge to water bodies, including wetlands. The state may issue certification, with or without conditions, or deny certification for activities that might result in a discharge to water bodies (USEPA 2010b).

Only 0.077 acres of potential CWA Section 404 jurisdictional area were found within the survey area. These acres were classified as ephemeral drainage.

3.8.2 Affected Environment

Thirteen non-jurisdictional surface water features were identified during wetland delineations (see **Figure 3-2**). Two features were ephemeral drainages, episodic channels that appear to convey flows only during and immediately after precipitation events, and eleven features were road pools or ponding in the existing road due to low permeability of the soils. These features have not been delineated as jurisdictional based on the 2008 USACE and USEPA joint memorandum on guidance (post-U.S. Supreme Court decision in *Rapanos and Carabell vs. The United States*). This guidance states that agencies will not assert jurisdiction over erosional features and ditches that are only draining upland. Executive guidance established during the Obama administration was rescinded and the jurisdiction reverts to the post-Rapanos delineation approach, therefore this guidance is again relevant to the jurisdictional assessments.

Non-Wetland Waters. The project area contains two ephemeral drainages. The western crossing has a clearly delineated bed and bank with an ordinary high-water mark (OHWM). The eastern drainage is more complex, but due to the high levels of disturbance, there is not a clear bed and bank, but there is evidence of an OHWM in portions of the eastern drainage. There are no wetlands or Waters of the United States in the project area. However, similar to wetland waters, these features occur in areas that have been heavily altered by human activity.

Other Features Not Mapped as Potentially Jurisdictional. There are many eroded channels within the existing footprint of 1418 Firebreak Road, especially towards the northern end of the project area. The road is impassable in some areas and bypass roads have been informally constructed. Additionally, there are eleven ponded areas referred to as road pools that are not associated with any drainages or other potential features. Although these features would be considered isolated waters and not regulated by USACE, they are potential habitat for endangered species and may be regulated by ESA.

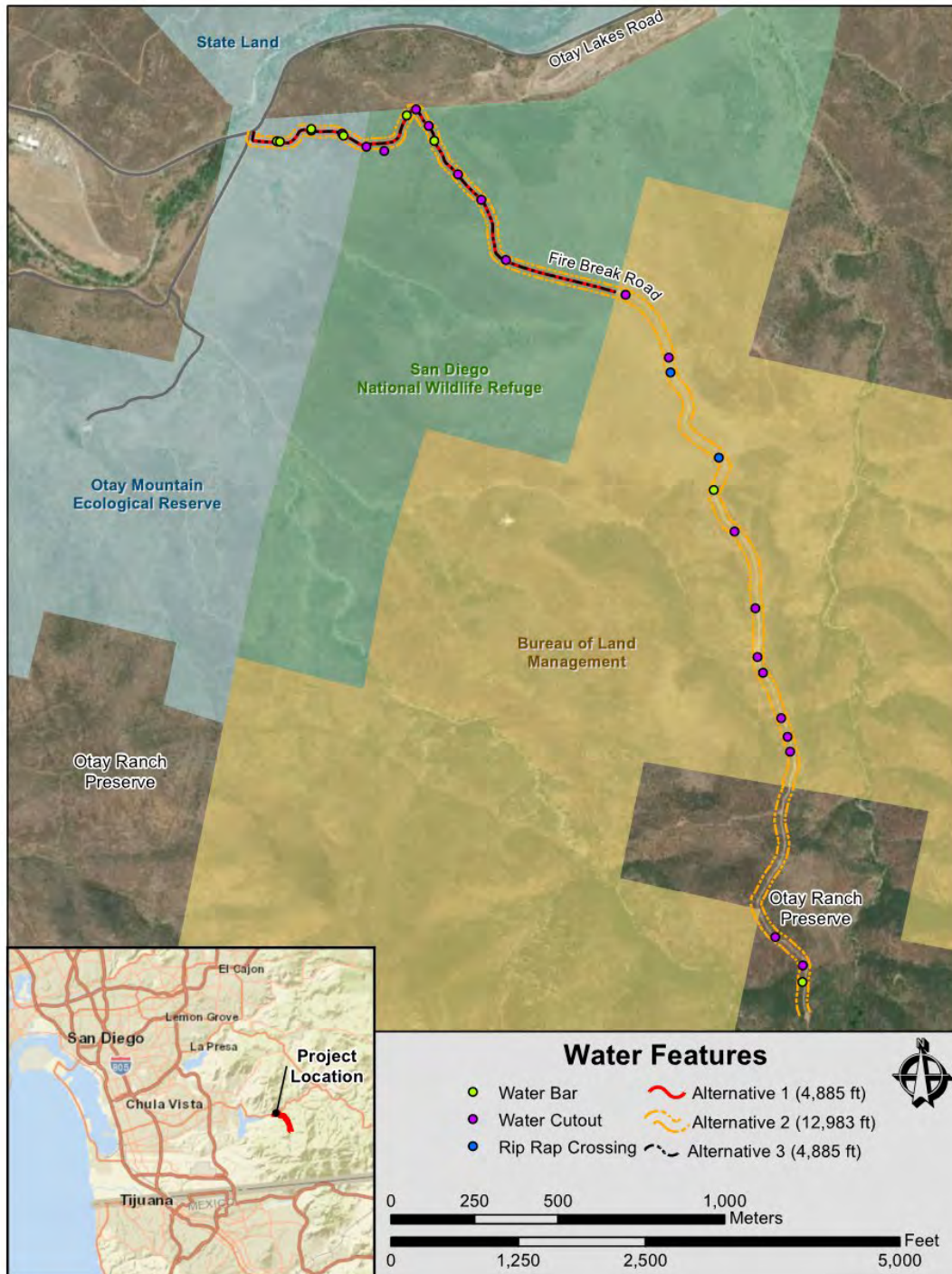


Figure 3-2. Water Features within the Proposed Project Area

3.8.3 Environmental Consequences

3.8.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Short-term, negligible, indirect, adverse impacts could occur from vegetation clearing and debris removal, which could cause the deposition of fill materials or increased sedimentation into surface water or ephemeral drainages. However, maintenance and repair of the roadway would be conducted in such a manner as to have negligible impacts on surface waters and drainage resources to the maximum extent practical. Erosion-control BMPs would be adopted to maintain runoff on site and would minimize the potential for adverse effects on downstream water quality. Pertinent local, state, and Federal permits would be obtained for any work, including work that could occur near surface water or ephemeral drainages.

Installation of water bars would result in short-term, minor, adverse impacts on water quality due to an increase in turbidity from a disturbance in sediments and potential for contaminants to enter water bodies during construction activities, such as through leaking or spills from construction equipment. Long-term, beneficial impacts would occur after installation because the drainage features would properly manage stormwater flow and minimize long-term erosion.

3.8.3.2 Alternative 2: Complete Road Improvement

Implementation of Alternative 2 would result in short-term, negligible, indirect, adverse impacts from vegetation clearing and debris removal. Impacts resulting from Alternative 2 would be expected to be great than those of Alternative 1 as the two ephemeral drainages fall within the project area for Alternative 2. Loss of waters resulting from the implementation of Alternative 2 would be minor to moderate. As with Alternative 1, erosion-control BMPs would be adopted to maintain runoff on site and minimize the potential for adverse effects on downstream water quality. Pertinent local, state, and Federal permits would be obtained for any work in waterways.

As with Alternative 1, installation of water bars would result in short-term, minor, adverse impacts on water quality due to an increase in turbidity from a disturbance in sediments and potential for contaminants to enter into water bodies during construction activities. Long-term, beneficial impacts would occur after installation activities have ceased and stormwater flow is properly managed.

3.8.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Implementation of Alternative 3 would result in short-term, negligible, indirect, adverse impacts from vegetation clearing and debris removal. Impacts resulting from Alternative 3 would be expected to be greater than Alternative 1 due to the potential for more frequent maintenance and repair activities. With the installation water bars, long-term, minor beneficial impacts on water quality would occur due to drainage features properly managing stormwater flow and minimizing long-term erosion.

3.8.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, there is a potential for short- and long-term, minor, direct and indirect adverse impacts on surface waters. The No Action Alternative would result in greater

impacts on surface waters than Alternative 1 because the remaining area would be considered a minimal flood hazard area. Therefore, the degrading roadway could lead to increased sediments, nutrients, and contaminants in water-related features and blocked drainage structures could increase flood risk.

3.9 FLOODPLAINS

3.9.1 Definition of the Resource

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are periodically inundated. Floodplain ecosystem functions include natural moderation of floods through flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and support of a diversity of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body (FEMA 1994).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year (FEMA 1994). Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety. E.O. 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. E.O. 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with E.O. 11988 outlined in the FEMA document, *Further Advice on Executive Order 11988 Floodplain Management*.

3.9.2 Affected Environment

The project area is mapped as an area of minimal flood hazard. No existing floodplain information on the project area exists; however, the northern access to Firebreak Road is within 300 feet of the Otay River. The staging area and the access road to Firebreak Road are in low areas near the river. Based on vegetation and topography, it is likely these areas are within the historic floodplain for the Otay River. The surrounding area is a minimal flood hazard; however, no floodplain mapping for the Otay River exists for the project area.

The remainder of the project area goes upslope and most of the project area is either climbing to or along a ridgeline and outside of any floodplains. All water from this project area drains into the Otay River Watershed, specifically the Dulzura segment, which drains into San Diego Bay.

3.9.3 Environmental Consequences

The Proposed Action would be considered to cause a major, adverse impact on floodplains if it were to site habitable structures within the floodplain or alter flood hazards as designated on a FIRM.

3.9.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Short-term, negligible, indirect impacts on floodplain areas would be anticipated from the implementation of Alternative 1. Due to vegetation clearing, increased sedimentation into drainage structures could occur. However, clearing blocked drainage structures of debris and fill materials would result in short- and long-term, direct and indirect, beneficial impacts on floodplains by improving conveyance of floodwaters. Widening of the road and clearing of vegetation would result in an increase of flow as well as an increase in the speed of flow. BMPs would be implemented to minimize any potential impacts on floodplains. The maintenance and repair of the existing roadway would be conducted in such a manner as to have negligible impacts on floodplains as drainage mitigation measures would be implemented.

3.9.3.2 Alternative 2: Complete Road Improvement

Short-term, negligible, indirect impacts on floodplain areas would be anticipated from the implementation of Alternative 2. As with Alternative 1, vegetation clearing could cause increased sedimentation into drainage structures, though clearing blocked drainage structures of debris and fill materials would result in short- and long-term, direct and indirect, beneficial impacts on floodplains. BMPs would be implemented to minimize any potential impacts on floodplains. Impacts associated with this alternative would be comparable to those of Alternative 1.

3.9.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Proper maintenance of the existing FC-4 road would have short- and long-term, minor, direct, beneficial impacts on floodplains by minimizing erosion of road material into floodplain areas. Improper maintenance would result in short- to long-term, negligible to minor, direct and indirect, adverse impacts on floodplains by increasing erosion and adding fill materials into floodplain areas. Impacts associated with Alternative 3 would be expected to be greater than those of Alternative 1 due to the probability of repair activities being conducted more frequently as repair activities would be more reactive in nature.

3.9.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, there is a potential for short- and long-term, minor, direct and indirect, adverse impacts on floodplains as maintenance and repairs activities would not be conducted. Degrading roadway and blocked drainage structures impair flow, which could increase flood risk. This approach would result in greater impacts on floodplains than Alternative 1 because maintenance and repair activities would not be conducted.

3.10 AIR QUALITY

3.10.1 Definition of the Resource

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

Under the CAA, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone (O₃), measured as either volatile organic compounds (VOCs) or total nitrogen oxides (NO_x), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur oxides (SO_x), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM₁₀] and particulate matter equal to or less than 2.5 microns in diameter [PM_{2.5}]), and lead (Pb) (40 CFR Part 50). The CAA also gives the authority to states to establish air quality rules and regulations.

California has also established its own ambient air quality standards for these pollutants, which in some cases are stricter than the NAAQS, and also include sulfates, hydrogen sulfide, and visibility reducing particulates as principal air pollutants.

The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

The General Conformity Rule requires that any Federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones towards achieving compliance with the NAAQS. The General Conformity Rule applies only to regionally significant actions in nonattainment or maintenance areas.

Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to a major stationary source, (i.e., source with the potential to emit of 250 tons per year [tpy] of any criteria pollutant), and a significant modification to a major stationary source, (i.e., change that adds 15 to 40 tpy to the facility’s potential to emit depending on the pollutant). PSD regulations can also apply to stationary sources if (1) a proposed project is within 6.21 miles of national parks

or wilderness areas, (i.e., Class I Areas), and (2) regulated stationary source pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) or more (40 CFR 52.21[b][23][iii]). A Class I area includes national parks larger than 6,000 acres, national wilderness areas and national memorial parks larger than 5,000 acres, and international parks. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's class designation (40 CFR 52.21[c]).

Title V of the CAA Amendments of 1990 requires states and local agencies to use a permitting process for major stationary sources. A major stationary source has the potential to emit more than 100 tpy of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA defines the sources and kinds of HAPs.

GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane, and nitrous oxide. GHGs are mainly produced by the burning of fossil fuels and through industrial and biological processes. On September 22, 2009, the USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on CO_2 and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO_2 equivalent emissions per year but excludes mobile source emissions. GHG emissions will also be factors in PSD and Title V permitting and reporting, according to a USEPA rulemaking issued on June 3, 2010 (75 FR 31514). GHG emissions thresholds of significance for stationary sources are 75,000 tons CO_2 equivalent per year and 100,000 tons CO_2 equivalent per year under these permit programs.

3.10.2 Affected Environment

The project area is within the San Diego Intrastate AQCR (SDIAQCR) (40 CFR 81.164). San Diego County is designated by USEPA as nonattainment for 8-hour O_3 (moderate), maintenance for CO, and attainment for the remaining criteria pollutants (USEPA 2019). The county is designated by the California Environmental Protection Agency (Cal/EPA) as nonattainment for 8- and 1-hour O_3 , PM_{10} , and $\text{PM}_{2.5}$ and attainment for the remaining criteria pollutants and sulfates, hydrogen sulfide, and visibility reducing particulates (SDAPCD 2017).

There are very few air emissions sources currently in the project area and all are transient. Air emissions are currently generated from vehicle operations, most notably from USBP agents responding to cross border violations.

3.10.3 Environmental Consequences

The environmental consequences on local and regional air quality conditions near a proposed action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would

be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard,
- Expose sensitive receptors to substantially increased pollutant concentrations,
- Exceed any evaluation criteria established by a SIP or permit limitations/requirements, and/or
- Emissions representing an increase of 100 tpy for any attainment criteria pollutant (NO_x, VOCs, CO, PM₁₀, PM_{2.5}, SO₂), unless the proposed activity qualifies for an exemption under the Federal General Conformity Rule.

Based on compliance with the NAAQS, the General Conformity Rule is only applicable in San Diego County to emissions of O₃ and CO and as outlined in 40 CFR § 93.153(b), the applicable *de minimis* threshold for both pollutants is 100 tpy. While the General Conformity Rule is not applicable to emissions of the other criteria pollutants, it is being applied as a conservative measure of significance to determine the level of impacts under NEPA. The rationale for this conservative threshold is that it is consistent with the highest General Conformity *de minimis* levels for nonattainment areas and maintenance areas. In addition, it is consistent with Federal stationary source major source thresholds for Title V permitting, which formed the basis for the nonattainment *de minimis* levels.

The Air Pollution Control District of San Diego County does not provide quantitative screening level thresholds for construction or mobile source-related impacts. However, the district does specify threshold levels for new or modified stationary sources. If a proposed action's stationary source emissions are below these threshold levels, the proposed action's impacts on air quality are presumed to be negligible to minor. Major, adverse impacts on air quality would also occur if the Proposed Action meaningfully contributed to the potential effects of global climate change.

3.10.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Alternative 1 would only generate temporary air pollutant emissions. The maintenance and repair activities associated with this alternative would generate air pollutant emissions because of grading, filling, compacting, trenching, and other activities; however, these emissions would be temporary and would not be expected to generate any offsite effects. Alternative 1 is not anticipated to result in a net increase in USBP traffic along the roadway. Therefore, the emissions associated with Alternative 1 from existing USBP traffic would not result in an adverse impact on local or regional air quality.

For the purpose of analysis in this EA, the total mileage of roadway for each alternative was obtained to estimate air emissions. **Table 3-4** describes the approximate mileage and acreage that would be graded. **Appendix H** contains air quality emissions calculations for Alternative 1.

Table 3-4. Approximate Surface Area to be Graded During Maintenance and Repair Activities

Alternative	Total Road (ft)	Area Included in Air Quality Analysis ¹ (acres)
1	4,885	2.69
2	12,983	7.15
3	4,885	7.15
No Action ²	0	0

Key: NA = not applicable

Notes:

1. Area of land disturbance considered in this air quality analysis assumes the width of disturbance would be 24 ft multiplied by the length.
2. Under the No Action Alternative, no construction or repairs would be conducted.

Criteria pollutant and GHG air emissions would be produced from the combustion of fuels in heavy equipment. Particulate matter air emissions, such as fugitive dust, would be produced from ground-disturbing activities and the combustion of fuels in heavy equipment. Fugitive dust air emissions would be greatest during the initial site grading and excavation and vary day to day depending on the work phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Construction would incorporate BMPs and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions. Additionally, work vehicles are assumed to be well maintained and use diesel particulate filters to reduce particulate matter air emissions. Workers and truck drivers commuting daily to and from the job site in their personal vehicles and heavy-duty diesel vehicles hauling grading and rock materials to the job site would also result in criteria pollutant and GHG air emissions.

Table 3-5 summarizes all criteria pollutant and GHG air emissions resulting from Alternative 1 as well as applicable thresholds. Criteria pollutant emissions from construction would be below the *de minimis* threshold of 100 tpy of each pollutant; therefore, impacts would be minor and a General Conformity determination (applicable to O₃ and CO) is not required. Air Pollution Control District of San Diego County screening level thresholds do not apply to construction emissions. Detailed emissions calculations are provided in **Appendix H**.

The maintenance and repair activities associated with Alternative 1 would not have significant effects on regional or local air quality. Alternative 1 would generate emissions well below *de minimis* levels for all criteria pollutants in the SDIAQCR, and all emissions would be temporary.

Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels from maintenance and repair activities and commuting of support personnel. CO₂ accounts for 92 percent of all GHG emissions; transportation is the primary source of anthropogenic CO₂, followed by electric utilities (CARB 2019).

Table 3-5. 2020 Estimated Construction Air Emissions from Alternative 1

Emissions Source¹	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO₂ (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)	GHGs (tpy)
Combustion	0.337	0.020	0.136	0.029	0.021	0.020	41.50
Fugitive Dust	-	-	-	-	6.782	0.678	-
Haul Truck On-Road	0.215	0.019	0.071	0.001	0.008	0.008	58.92
Construction Commuter	0.195	0.164	1.966	0.001	0.004	0.004	175.02
Total	0.75	0.20	2.17	0.03	6.82	0.71	275.43
Thresholds ²	100	100	100	100	100	100	NA

Key: NA = not applicable

Notes:

¹ Lead, sulfates, hydrogen sulfide, and visibility reducing particulates emissions are not included as they are negligible for the types of emission sources under this Proposed Action.

² General Conformity Rule *de minimis* thresholds or surrogate.

The U.S. Energy Information Administration (EIA) estimates that in 2017, gross CO₂ emissions in the State of California were 358.6 million metric tons of CO₂ equivalent (EIA 2019). The total annual CO₂ emissions from Alternative 1 in California would be 275.43 metric tons, or less than 0.001 percent of the state CO₂ emissions (see **Appendix H**). Therefore, Alternative 1 would represent a negligible contribution towards statewide GHG inventories.

Alternative 1 would emit approximately 275 tons of GHGs from construction during 2020. By comparison, 275 tons of carbon dioxide equivalent are approximately the respective GHG footprints of 14 single-family houses with two cars per home (USEPA 2017). As such, these increases and decreases of GHG emission rates would not meaningfully contribute or lessen the potential effects of global climate change (e.g., increases in atmospheric temperature, sea level, storm activity, accelerated coastal erosion, hydrological changes and flooding, and vegetation and wildlife changes).

As noted in **Section 3.10.2**, ongoing changes to regional climate patterns could increase average temperatures, alter precipitation patterns, and increase the frequency and severity of droughts in southern California (Garfin et al. 2014). However, even under severe drought conditions or during warmer temperatures, it is unlikely these ongoing climate change impacts would impair implementation of Alternative 1 or prevent CBP from fulfilling its mission.

3.10.3.2 Alternative 2: Complete Road Improvement

As with Alternative 1, Alternative 2 would generate only temporary air pollutant emissions. However, emissions from Alternative 2 would be greater than those of Alternative 1 due to the expanded section of roadway slated for improvement. Maintenance and repair activities would generate air pollutant emissions, but these emissions would be temporary and would not be expected to generate any offsite effects. As with Alternative 1, Alternative 2 is not anticipated to result in an increase of USBP traffic along the roadway and therefore would not result in an adverse impact on local or regional air quality.

Maintenance and repair activities would result in short-term emissions of criteria pollutants as combustion products from construction equipment. Emissions of all criteria pollutants would result from construction activities including combustion of fuels from on-road haul trucks transporting materials and construction commuter emissions. Fugitive dust air emissions would be greatest during the initial site grading and excavation and vary day to day depending on the work phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Construction would incorporate BMPs and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions. Additionally, work vehicles are assumed to be well maintained and use diesel particulate filters to reduce particulate matter air emissions. Construction workers commuting daily to and from the job site in their personal vehicles and heavy-duty diesel vehicles hauling construction materials to the job site would also result in criteria pollutant and GHG air emissions.

Table 3-6 summarizes all criteria pollutant and GHG air emissions resulting from Alternative 2 as well as applicable thresholds. Criteria pollutant emissions from construction would be below the *de minimis* threshold of 100 tpy of each pollutant; therefore, impacts would be minor and a General Conformity determination (applicable to O₃ and CO) is not required. Air Pollution Control District of San Diego County screening level thresholds do not apply to construction emissions.

The maintenance and repair activities associated with Alternative 2 would not have significant effects on regional or local air quality, generating only short-term emissions well below *de minimis* levels for all criteria pollutants in the SDIAQCR.

Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels from maintenance and repair activities and support personnel commuting. GHGs emissions from Alternative 2 would be expected to be greater than those from Alternative 1 due to the expanded section of roadway slated for improvement. The total annual CO₂ emissions from Alternative 2 in California would be 437.17 metric tons, or less than 0.001 percent of the state CO₂ emissions (see **Appendix H**). Therefore, Alternative 2 would represent a negligible contribution towards statewide GHG inventories.

3.10.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Under Alternative 3, CBP would continue to maintain and repair the roadway and short- and long-term, negligible to minor, adverse impacts on air quality would be anticipated from emissions associated with combustion of fossil fuels, particulate matter, and fugitive dust emissions. Alternative 3 would be expected to result in greater impacts on air quality than Alternative 1 because maintenance could occur more frequently.

Under the General Conformity Rule, a number of different Federal activities are exempt. The exemption under 40 CFR 93.153(c)(iv) of the General Conformity rules states, “routine maintenance and repair activities, including repair and maintenance of administrative sites, roads, trails, and facilities” are exempt from General Conformity. All proposed activities associated with Alternative 3 would include routine maintenance and repair activities and are considered to be exempt under the General Conformity Rule

Table 3-6. 2020 Estimated Construction Air Emissions from Alternative 2

Emissions Source ¹	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)	GHG _s (tpy)
Combustion	0.877	0.051	0.357	0.076	0.054	0.052	108.30
Fugitive Dust	-	-	-	-	18.026	1.803	-
Haul Truck On-Road	0.560	0.050	0.187	0.001	0.022	0.020	153.85
Construction Commuter	0.195	0.164	1.966	0.001	0.004	0.004	175.02
Total	1.63	0.26	2.51	0.08	18.11	1.88	437.17
Thresholds ²	100	100	100	100	100	100	NA

Key: NA = not applicable

Notes:

¹ Lead, sulfates, hydrogen sulfide, and visibility reducing particulates emissions are not included as they are negligible for the types of emission sources under this Proposed Action.

² General Conformity Rule *de minimis* thresholds or surrogate.

Table 3-7 summarizes all criteria pollutant and GHG air emissions resulting from Alternative 3 as well as applicable thresholds. Criteria pollutant emissions from construction would be below the *de minimis* threshold of 100 tpy of each pollutant; therefore, impacts would be minor and a General Conformity determination (applicable to O₃ and CO) is not required. Air Pollution Control District of San Diego County screening level thresholds do not apply to construction emissions.

Alternative 3 would contribute directly to emissions of GHGs from the combustion of fossil fuels from maintenance and repair activities and support personnel commuting. GHGs emissions from Alternative 3 would be expected to be greater than those from Alternative 1 due to more frequent maintenance. The total annual CO₂ emissions from Alternative 3 in California would be 437.17 metric tons, or less than 0.001 percent of the state CO₂ emissions (see **Appendix H**). Therefore, Alternative 3 would represent a negligible contribution towards statewide GHG inventories.

3.10.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. CBP enforcement actions would be maintained at current levels or diminish over time due to inaccessibility of the area to CBP agents. Therefore, no impacts no air quality would be expected from the implementation of the No Action Alternative because no maintenance or repair activities would occur in the project area.

3.11 NOISE

3.11.1 Definition of the Resource

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by humans (see **Sections 3.5.3** and **3.6.3** for noise impacts to wildlife). Noise can be defined as unwanted sound that interferes with communication, poses a threat to health, or is irritating. Noise can be intermittent or continuous, steady or impulsive, and can involve any

Table 3-7. 2020 Estimated Construction Air Emissions from Alternative 3

Emissions Source¹	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO₂ (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)	GHG_s (tpy)
Combustion	0.877	0.051	0.357	0.076	0.054	0.052	108.30
Fugitive Dust	-	-	-	-	18.026	1.803	-
Haul Truck On-Road	0.560	0.050	0.187	0.001	0.022	0.020	153.85
Construction Commuter	0.195	0.164	1.966	0.001	0.004	0.004	175.02
Total	1.63	0.26	2.51	0.08	18.11	1.88	437.17
Thresholds ²	100	100	100	100	100	100	NA

Key: NA = not applicable

Notes:

¹ Lead, sulfates, hydrogen sulfide, and visibility reducing particulates emissions are not included as they are negligible for the types of emission sources under this Proposed Action.

^{2b} General Conformity Rule *de minimis* thresholds or surrogate.

number of sources and frequencies. Response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise-sensitive land uses include areas where an excessive amount of noise would interfere with normal activities. Noise is often generated by activities essential to a community's quality of life, such as construction or vehicular traffic.

Sound Metrics. Sound varies by both intensity and frequency. Sound pressure level, expressed in decibels (dB), is used to quantify sound intensity. Within the range of human hearing, a sound may vary in intensity by more than 1 million units. A logarithmic scale is used to compress the range of audible decibels into a more manageable form so that noise can be quantified. The A-weighted decibel (dBA) is used to characterize sound levels that can be sensed by the human ear. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The upper boundary of audibility is 135 dBA and can be painfully loud (USEPA 1981). Sounds encountered in daily life and their dBA levels are provided in **Table 3-8**.

Table 3-8. Common Sounds and Their Levels

Outdoor Noise Sources	Sound Level (dBA)	Indoor Noise Sources
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Vacuum cleaner
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris 1998

The sound pressure level noise metric describes steady noise levels. Very few noises are constant; therefore, additional metrics have been developed to describe noise. The day-night average A-weighted noise level (DNL) averages the sum of all noise-producing events over a 24-hour period. DNL is a useful descriptor for noise because it averages ongoing yet intermittent noise and measures total sound energy over a 24-hour period with penalties applied to noise levels during nighttime hours (County of San Diego 2016).

Regulatory Overview. The Noise Control Act of 1972 (Public Law 92-574) serves “to promote an environment for all Americans free from noise that jeopardizes their public health and welfare.” In San Diego County, residential, commercial and residential mixed-use, and agricultural land uses are compatible (acceptable) within areas with exterior DNL noise exposure levels at or below 60 dBA, at or below 65 dBA, and at or below 70 dBA, respectively (County of San Diego 2016). The San Diego County Code of Regulatory Ordinances relating to Noise Control and Abatement (County Noise Ordinance) states that it is unlawful for residential, agricultural, or civic uses within the A72 zone (i.e., zone for the proposed 1418 Firebreak Road improvement) to generate noise exceeding the 1-hour average sound level limits of 50 dBA (from 7 a.m. to 10 p.m.) and 45 dBA (from 10 p.m. to 7 a.m.). The County Noise Ordinance further states that construction equipment operations must not exceed an average sound level of 75 dB over an 8-hour period, between 7 a.m. and 7 p.m., or produce an impulsive noise that exceeds a maximum sound level in surrounding occupied properties (82 dBA for residential uses and 85 dBA for agricultural and commercial uses) for more than 15 minutes within a 1-hour measurement period.

Construction Sound Levels. Noise generated by construction activities has the potential to quickly surpass ambient sound levels. The type and intensity of the sound is dependent upon the type of construction activity taking place. The predicted noise levels for various construction equipment that might be used during Alternative 1 are presented in **Table 3-9**.

3.11.2 Affected Environment

The proposed project site is undeveloped and in a rural area. The surrounding area contains scattered residences, ecological reserve, wildlife refuge, and commercial businesses. Additionally, Johns Nichol’s Field Airport is located 0.33 miles west of 1418 Firebreak Road and contains one commercial business. Sensitive receptors in the vicinity include residences within approximately 2.3 miles of the footprint of the proposed 1418 Firebreak Road improvement.

3.11.3 Environmental Consequences

The impacts associated with noise were evaluated based on the changes to the ambient noise environment that would result from implementation of the Proposed Action. Impacts would be considered adverse if the Proposed Action were to result in the violation of applicable Federal, state, or local noise regulations; or create appreciable areas of incompatible land use.

Table 3-9. Predicted Noise Levels for Typical Construction Equipment

Construction Equipment	Predicted Noise Level at 50 feet (dBA)	Predicted Noise Level at 500 feet (dBA)	Predicted Noise Level at 1,000 feet (dBA)	Predicted Noise Level at 2,000 feet (dBA)	Predicted Noise Level at 4,000 feet (dBA)
Clearing and Grading					
Bulldozer	80	60	54	48	42
Grader	80-93	60-73	54-67	48-61	42-55
Truck	83-94	63-74	57-68	51-62	45-56
Excavation					
Backhoe	72-93	52-73	46-67	40-61	34-55
Jackhammer	81-98	61-78	55-72	49-66	43-60
Roadway Improvement					
Concrete Mixer	74-88	54-68	48-62	42-56	36-50
Paver	86-88	66-68	60-62	54-56	48-50

Source: USEPA 1971

Note: Construction equipment equipped with noise control devices (e.g., mufflers) and use of sound barriers would result in lower noise levels than shown in this table.

3.11.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Construction. Construction noise from the proposed improvement to 1418 Firebreak Road would result in short-term, minor, adverse impacts on the ambient noise environment. Increases in noise levels would occur intermittently during construction. Noise from construction would vary depending on the type of equipment being used, the area in which the activity would occur, and the distance of the receptor from the noise source. Heavy construction equipment would be periodically used during construction; therefore, noise levels would fluctuate. Most equipment used would be expected to produce noise levels between approximately 70 and 100 dBA at a distance of 50 ft (see **Table 3-9**). Noise levels at the upper end of this range would be limited to intermittent spurts. Sound levels on the lower end of the range would be more constant during construction activities. These noise levels would decrease with distance from the construction area. Noise levels associated with typical construction equipment would noticeably attenuate to below 65 dBA between approximately 500 and 4,000 ft from the source, depending on the equipment used (see **Table 3-9**).

Construction activities usually require simultaneous use of several pieces of equipment. In general, the addition of a piece of equipment with identical noise levels to another piece of equipment would add approximately 3 dB to the overall noise environment, which is barely perceptible by the human ear (TRS Audio 2017). Cumulative noise associated with multiple pieces of construction equipment operating simultaneously would increase the overall noise environment by a few dB over the noisiest equipment, depending on the noise levels.

In addition, noise generation due to construction would be temporary, only lasting for the duration of construction activities, and would be isolated to normal workdays and working hours (i.e., weekdays 7 a.m. to 7 p.m.). All applicable noise laws and guidelines would be followed to reduce effects from noise produced by construction. Although the County Noise Ordinance does not apply to Federal property, CBP would comply with the ordinance to the extent practicable. Construction workers would be required to use proper personal hearing protection to limit exposure and would use the appropriate noise attenuation equipment.

The nearest sensitive receptors (i.e., permanent residences within approximately 2.3 miles of the footprint of the proposed 1418 Firebreak Road improvement) would not be substantially impacted by temporary construction equipment noise. Even the loudest construction equipment, a paver, would register at 48-50 dBA 0.75 miles from the source. This is approximately the same sound level as rainfall (see **Table 3-8**). Construction equipment noise impacts on sensitive receptors would be minor because of the minimal cumulative contribution of the construction equipment to existing ambient noise levels from traffic and agricultural equipment; the distance of the residential receptors from the construction area; and the use of noise attenuation equipment to ensure that noise levels would not exceed an average of 75 dB over an 8-hour period. While existing noise sources produce elevated noise levels intermittently, noise during construction would be more continuous (with temporary increases in noise levels from the use of the loudest equipment) between the hours of 7 a.m. and 7 p.m.

Short-term, minor, adverse impacts on wildlife would occur as a result of temporary noise disturbances associated with construction and demolition activities. Loud noise can disturb wildlife resulting in escape or avoidance behaviors; however, these effects would be temporary. Noise can also distort or mask bird communications signals (e.g., songs, warning calls, fledgling begging calls) and their ability to find prey or detect predators. If noise persists in a particular area, animals could leave their habitat and avoid it permanently. Avoidance behavior by animals requires the expenditures of excess energy that is needed for survival (e.g., finding new food sources, water sources, and breeding and nesting habitats) (Ellis et al. 1991). Noises associated with construction and demolition would only be expected to affect individual animals within close proximity (typically within 400 to 800 ft) to the noise sources. Wildlife species would generally be expected to recover quickly from noise disturbance once the construction activities have ceased. As a result, population-level impacts would not be expected to occur.

Maintenance. Long-term, negligible, adverse impacts on the ambient noise environment would periodically occur during proposed maintenance activities, which would primarily occur within the footprint of the existing roadway. Maintenance crews would be required to use proper personal hearing protection to limit exposure and would use the appropriate noise attenuation equipment when necessary. Noise from maintenance activities would not impact areas outside of the proposed 1418 Firebreak Road improvement area or sensitive receptors. Impacts would be similar to those described for construction because similar equipment would be required. These maintenance activities would be temporary and intermittent; therefore, no major, adverse impacts would be expected.

3.11.3.2 Alternative 2: Complete Road Improvement

Under Alternative 2, impacts on noise receptors would be greater than Alternative 1 as the noise would occur over a longer distance and period of time. However, the noise from equipment used for maintenance and repair activities would not occur closer to sensitive receptors and would be localized, short-term, and intermittent during machinery operations and normal working hours. The proposed maintenance and repair activities would be expected to result in noise levels comparable to those indicated in **Table 3-9**.

3.11.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Impacts on noise receptors from Alternative 3 would be similar to those described for Alternative 1. However, it can be reasonably anticipated that maintenance and repair activities would occur more frequently, and in more locations along 1418 Firebreak Road. Therefore, short-term impacts on noise from implementing Alternative 3 would be greater than Alternative 1 because it is possible that repair activities would occur more frequently. However, populations near the proposed maintenance and repair activities would have the potential to experience less of a long-term, adverse effect than that described for Alternative 1. Short-term and long-term impacts on noise from implementing Alternative 3 would be expected to be greater than Alternative 1.

3.11.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. Therefore, no impacts on noise would be expected from the implementation of the No Action Alternative because no maintenance or repair activities would occur in the project area.

3.12 CULTURAL RESOURCES

3.12.1 Definition of the Resource

The term “cultural resources” refers to a broad range of properties relating to history, prehistory, or places important in traditional religious practices. Several Federal laws and E.O.s, including the NHPA, the Archaeological and Historic Preservation Act (ARHA), the American Indian Religious Freedom Act (AIRFA), the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act (NAGPRA) refer to cultural resources. The NHPA focuses on property types such as prehistoric and historic sites, buildings and structures, districts, and other places that have physical evidence of human activity considered important to a culture or a community for scientific, traditional, religious, or other reasons. These resources can prove useful in understanding and describing the cultural practices of past peoples or retain cultural and religious significance to modern groups. Resources judged significant under criteria established in the NHPA are considered eligible for listing in the National Register of Historic Places (NRHP). The NRHP refers to these places as “historic properties” and they are protected under the NHPA.

The NHPA requires Federal agencies to consider the effects of their activities and programs on NRHP-eligible properties. Regulations for Protection of Historic Properties (36 CFR Part 800) present a process for Federal agencies to consult with the appropriate SHPO, Native American groups, other interested parties, and when appropriate, the Advisory Council on Historic

Preservation (ACHP). This is to ensure that the impacts from the undertaking are adequately considered on historic properties.

NAGPRA is a Federal law passed in 1990 that provides a process for museums and Federal agencies to return certain Native American cultural items—human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations.

Under the CEQA, resources deemed historically significant through an assessment based on the California Register of Historical Resources (CRHR) set forth in Public Resources Code (PRC) § 5024.1, Title 14 California Code of Regulations (CCR) § 4852 are defined as historical resources. Historical resources are prehistoric and historic resources listed, or determined to be eligible for listing, in the CRHR, a resource included in a local register of historical resources (CCR, Title 14(3) § 15064.5[a][2]), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (CCR, Title 14(3) § 15064.5[a][3]). The County of San Diego’s Resource Protection Ordinance defines “Significant Prehistoric or Historic Sites” as any resource formally determined eligible or listed in the NRHP by the Keeper of the National Register; one-of-a-kind, locally unique, or regionally unique cultural resources that contain a significant volume and range of data and materials; or any location of past or current sacred religious or ceremonial observances (County of San Diego 2016).

Under CEQA, Assembly Bill 52 recognizes tribal cultural values, in addition to scientific and archaeological values, when determining impacts and mitigation with a category of resources called tribal cultural resources (TCRs) (California OPR 2015); the California equivalent of TCRs. To qualify as a TCR, a resource must be listed, or determined eligible for listing, on the national, state, or local register of historic resources; or be a resource that a lead agency chooses to treat as a TCR based on the CRHR criteria and the cultural value of a resource to a California Native American tribe (PRC § 21074). To identify TCRs, lead agencies are required to consult with local Native American tribes in a manner that is cognizant of all parties’ cultural values and, where feasible, seeking agreement on a proposed action.

3.12.2 Affected Environment

The northern portion of 1418 Firebreak Road is depicted on the 1903 15’ 2° Cuyamaca USGS topographic map and originates from an unnamed road that follows the present-day path of Otay Lakes Road. The early 1418 Firebreak Road follows an unnamed creek that fed into the Lower Otay Reservoir. The 1943 Jamul 15’ map depicts 1418 Firebreak Road as an unimproved trail that follows the Little Cedar Canyon and Creek. In the 1955 Jamul 15’ USGS topographic map, 1418 Firebreak Road is clearly labeled as a “Jeep Trail.” Nearby, a land patent (homestead entry) was filed in 1891. This could be the origins of 1418 Firebreak Road.

Regional Prehistory. Prehistoric cultural chronology for the San Diego region subsequent to approximately 12,000 years ago is divided into three broad temporal periods: Paleoindian (San Dieguito Complex), Archaic (La Jolla Complex/Encinitas Tradition), and Late Prehistoric. The sequence is based on syntheses by Rogers (1939, 1945, 1966); Wallace (1955, 1978); Moriarty (1966); Warren (1967, 1968); and True (1980), among others. There is no accepted evidence of occupation in this region prior to 12,000 years ago.

The San Dieguito Complex period dates from 9,030 to 8,000 years Before Present (B.P.) Sites from this period have been identified as part of the Western Lithic Co-Tradition or part of the Western Pluvial Lakes Tradition (Davis et al. 1969; Bedwell 1970). Occupants of most sites dating to this time period made use of coastal and inland resources. Artifacts include bifaces, knives, scrapers, cobble tools, and milling tools and bone tools used to process plants, shellfish, fish, birds, and small and large mammals.

The La Jolla Complex/Encinitas Tradition period dates from 8,600 to 1,300 years B.P. Doughnut stones, discoidals, stone balls, plummet, Elko-eared points and stone, shell and bone beads appear in this period and shellfish gathering decreases. Hunting tools initially consisted of the atlatl and dart but quickly advanced to bow and arrow. Most sites were in coastal areas.

The Late Prehistoric period dates from 1,300 years B.P. to historic contact. The cultures are divided into two groups: “San Luis Rey” (Shoshonean) in northern San Diego County and “Kumeyaay” (Yuman) in southern San Diego County. Sites from this period include ceramics, although Cuyamaca sites have a variety of type artifacts, such as pipes and effigies. Use of other traditional tools continues; marked differences between the two groups include Cuyamaca clay-lined hearths and cemeteries separate from living areas.

Ethnography. The project area is within the historical territory of the Kumeyaay, which extends from Northern San Diego County and south beyond Ensenada, Mexico (Campo 2018). The Kumeyaay were historically referred to as the Diegueño after Mission San Diego de Alcalá was established. The main language spoken is Hokan within the Yuman language family with dialects that are further broken into Tipai (southern) and Ipai (northern). The Takic-speaking Luiseño and Cahuilla live to the north (Loumala 1978).

The Kumeyaay were organized into autonomous bands based on family clans known as Sh'mulq which usually occupied a main village and several smaller habitation sites. Communities seasonally disbanded and established smaller groups of between 200 and 1,000 people to gather, process, and store resources. Subgroups spoke individual dialects and often intermarried (Campo 2018; Royo 1999).

As typical California seasonal hunters and gatherers, the Kumeyaay diet consisted mainly of plant foods, especially acorns, but also various other seeds and bulbs. This was supplemented by small game, including mammals and reptiles, and coastal inhabitants also had access to fish, shellfish, and sea mammals (Loumala 1978). Plants were also used for medicinal and ceremonial, as well as utilitarian, purposes. The medicinal use of plants covered a wide range of ailments, including European-introduced diseases such as syphilis, smallpox, and tuberculosis (Gallegos et al. 1998). Ceremonial usage included tattoos, girls' puberty ceremonies, and rock art. A variety of objects were manufactured with plant materials, including houses, granaries, baskets, nets, adhesives, clothing, and soaps (Gallegos et al. 1998). The Kumeyaay maintained extensive trade networks as far east as the Colorado River, moving acorns, dried seafood, and seashells eastward and bringing salt, seeds, and mesquite beans west (Loumala 1978). The Jamul Indian Village, home of one of the federally recognized tribes of Kumeyaay people, is 8.6 miles north of the project area.

Regional History. The earliest explorations of the San Diego area began in 1542, when Juan Rodríguez Cabrillo and his party landed near Point Loma. Cabrillo had been tasked with the

exploration of the interior of the western United States by the Spanish monarch. Interaction with the Kumeyaay was initiated, but overall little attention was given to California until the 1700s.

Spanish settlement of the San Diego area began in 1769 when the Spanish developed plans to build four presidios (forts), and three towns along the California coastline stretching from San Diego northward to Monterey. The town sites, established between 1777 and 1797, included present-day Los Angeles, San Jose, and a small town near Santa Cruz, named Branciforte. The presidios were established at San Diego, Santa Barbara, Monterey, and San Francisco. Under Spain, the “borderlands were colonized as defenses against the intrusion of the English, French, Dutch, and Russians, with the Manila trade an important item for protection in California. They were held by two typical institutions: the mission and the presidio” (Bolton 1913; 1921; 1930 as cited in Aviña 1976).

Mission San Diego Alcalá was also founded in 1769, the first of 21 Franciscan missions built along the coast on the El Camino Real, from San Diego to Sonoma. The goals of the missions were tri-fold: they helped establish a Spanish presence on the West Coast, allowed for a means to Christianize the native peoples, and served to exploit the native population as laborers. The missionaries, or padres, would essentially serve as a mayor, or head of the town. The Kumeyaay socio-political structure was severely disrupted by the Mission, especially those living closest to the grounds (Loumala 1978).

The arrival of the Spanish missionaries brought about prevailing changes for the Native Americans, including high mortality rates and social changes due to the introduction of European diseases and customs (e.g., European farming methods) (Dobyns 1983; Walker and Hudson 1993). Due to the high mortality rates, many Native American villages were abandoned, with inhabitants fleeing to the missions.

The Kumeyaay population decreased due to disease, revolts, and changes to their traditional ways of life. The San Diego Mission, however, was unique in that it allowed neophytes to move freely between the mission and traditional villages to hunt and gather food for the struggling mission. This allowed the Kumeyaay to experience a smaller population decline than Native Americans at other California missions. Those who did not return to the mission, however, were hunted as criminals (Carrico 2008).

Mexico gained independence from Spain in 1821 taking control of the lands Spain once held. The Secularization Act of 1833 transferred much of the mission lands to political appointees. Between 1840 and 1846, the Governors of California, Juan B. Alvarado, Manuel Micheltorena and Pio Pico, made a series of land grants, transferring Mission properties to private ownership (Cowan 1977; Ohles 1997).

In 1846, the Mexican-American War broke out in part because of American excursions into California. In 1847, General Andrés Pico and John C. Frémont signed the Articles of Capitulation, ending hostilities between the United States and Mexico. The United States and Mexico signed the Treaty of Guadalupe Hidalgo, which resulted in Mexico ceding the lands of present-day California, New Mexico, and Texas to the United States for \$15 million (Fogelson 1993:10). Within 2 years of the Treaty of Guadalupe Hidalgo, California applied for admission as a state.

Known Cultural Resources. In October 2019, *Class III Cultural Resources Survey for the Proposed Improvement, Operation, Maintenance, and Repair Of the 1418 Firebreak Road Project in the Chula Vista Station Area of Responsibility of the U.S. Border Patrol San Diego Sector, San Diego County, California* was completed (Cogstone 2019). According to the study, surveys occurred during April and May 2019 and included an intensive-level pedestrian survey of the project area with no larger than 49.21-foot-wide transects. Smaller transects were used in narrower areas of the project area and within previously recorded and newly discovered archaeological sites. There were seven prehistoric and historic sites previously recorded within the project area; these were revisited and updated on California State Parks and Recreation Series (DPR) 523 forms. No artifacts were collected, and no significant resources are in the project area.

3.12.3 Environmental Consequences

Adverse effects on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or selling, transferring, or leasing the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

Ground-disturbing activities associated with the implementation of the Proposed Action constitute the most relevant potential impacts on cultural resources.

3.12.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Under Alternative 1, ground-disturbing activities would occur within or adjacent to the existing footprint of the roadway (up to 24-foot wide in compliance with FC-2 design standards). If previously documented or newly discovered archaeological sites are found, mitigation measures (including avoidance of the sites) would be implemented. Alternative 1 would have negligible to minor adverse effects on cultural resources.

The potential exists for the unanticipated discovery of cultural resources or human remains during the maintenance and repair of roadway. Consequently, CBP would develop appropriate measures that detail crew member responsibilities for reporting in the event of a discovery during maintenance and repair activities. These measures would also include mitigation procedures to be implemented in the event of a significant unanticipated find. If human remains are discovered, CBP would adhere to the stipulations of Public Resources Code Section 5097.98 and Health and Safety Code 7050 and stop work within 50 ft of the discovery. CBP would then contact the county coroner and a professional archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in archaeology or history to determine the significance of the discovery. If appropriate, CBP would also adhere to NAGPRA and its implementing regulations (43 CFR 19). Depending on the recommendations of the coroner or the archaeologist, CBP would consult with the county to establish additional mitigation procedures. Potential mitigation procedures for unanticipated discoveries include avoidance, documentation, excavation, and curation. As a result, potential impacts on cultural resources discovered during the maintenance and repair of tactical infrastructure would be minor.

3.12.3.2 Alternative 2: Complete Road Improvement

Long-term, negligible to minor, adverse impacts on cultural resources would be expected from the implementation of Alternative 2. Under this alternative, ground-disturbing activities would be more extensive than Alternative 1 and occur within or adjacent to the existing footprint of the roadway (up to 24-foot wide in compliance with FC-2 design standards). As with Alternative 1, if previously documented or newly discovered archaeological sites are discovered, mitigation measures would be implemented. Alternative 2 would have negligible to minor adverse effects on cultural resources.

3.12.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Under Alternative 3, CBP would continue to maintain and repair the roadway, although there is a potential for such maintenance and repair activities to occur more frequently under this alternative. If previously documented or newly discovered archaeological sites are discovered, mitigation measures would be implemented; however, ground-disturbing activities would be confined to the existing footprint of the roadway. As a result, Alternative 3 would have a negligible to minor impact on cultural resources.

3.12.3.4 Alternative 4: No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. Therefore, no impacts on cultural resources would be expected from the implementation of the No Action Alternative because no ground-disturbing activities would occur in the project area.

3.13 RECREATION AND ACCESS

3.13.1 Definition of the Resource

The term “recreation” refers to activities of leisure often done for enjoyment, amusement, or pleasure. Recreation is an essential part of human life and can be found in many different forms that are shaped by the interests of the individual, as well as their surrounding social construction. Public spaces, such as ecological reserves, wildlife refuges, and ranches are essential venues for many of these recreational activities. Tourist activities reflect that visitors are specifically attracted by the recreational activities that certain venues can offer. Therefore, recreation is an important factor in the economy, and outdoor recreation alone is among the nation’s largest economic sectors.

Outdoor recreation can include activities such as hiking, hunting, camping, horseback riding, wildlife viewing, and biking. According to the Wilderness Society, nearly 50 percent of all Americans—141.1 million people—participated in at least one outdoor activity in 2011, totaling to 11.6 billion outings. And in 2019, Americans enjoyed 1.5 billion more outings than the previous year. It is estimated that outdoor recreational activity contributes roughly \$730 billion to the economy of the United States (The Wilderness Society 2020).

3.13.2 Affected Environment

As stated in **Section 3.2**, land ownership of the project area includes various state, Federal, and local agencies. The project area includes the OMER, San Diego NMR, Otay Mountain Wilderness, and Otay Ranch Preserve. These lands hold many different opportunities for recreational activities, including but not limited to hiking, hunting, camping, horseback riding, wildlife viewing, and biking.

Individuals seeking opportunities to engage in these activities occasionally use 1418 Firebreak Road for access. Along the road, there is a gate at which individuals have been known to park and leave their cars. Improvement of the roadway would temporarily close the road, resulting in decreased access for hikers and mountain bikers who would normally park along the road. Over the long-term, improving the road could potentially affect unauthorized mechanized activity in the wilderness.

3.13.3 Environmental Consequences

3.13.3.1 Alternative 1: Preferred Alternative (Partial Road Improvement)

Following the implementation of this alternative, 1418 Firebreak Road would be temporarily closed to the public. Short-term, direct, minor to moderate impacts would occur from the temporary closure of the road. With the closure of the road, individuals would no longer be allowed to use the area near the gate as a makeshift parking lot, therefore temporarily decreasing access to public lands for recreational use. Long-term, indirect, negligible to minor impacts could occur from the improvement of the roadway, because more individuals could increasingly use 1418 Firebreak Road to access these public lands for recreation.

3.13.3.2 Alternative 2: Complete Road Improvement

As with Alternative 1, 1418 Firebreak Road would be temporarily closed to the public with the implementation of Alternative 2. Short-term, direct, moderate impacts would occur from the temporary closure of the road. These impacts would be expected to be greater than Alternative 1 as the complete roadway improvement would last longer than the partial roadway improvement. Construction would occur over a longer period of time and therefore result in a longer closure of the roadway. As with Alternative 1, under the road closure, individuals would no longer be allowed to use the area near the gate as a makeshift parking lot, therefore temporarily decreasing access to public lands for recreational use. Long-term, indirect, negligible to minor impacts could occur from the improvement of the roadway because more individuals could increasingly use 1418 Firebreak Road to access these public lands for recreation. Such impacts would be expected to be similar to impacts associated with Alternative 1.

3.13.3.3 Alternative 3: Improve Drainage Features Without Widening Road

Under this alternative, impacts on recreation would be expected to be similar to Alternative 1, as improvement activities under Alternative 3 are identical to Alternative 1 in all aspects except road widening.

3.13.3.4 No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. CBP enforcement actions would be maintained at current levels or diminish over time due to inaccessibility of the area to CBP agents. The No Action Alternative would result in the continuation of individuals using the road to access public lands for recreational uses. No effects on recreation would be expected as a result of the No Action Alternative.

4 CUMULATIVE AND OTHER IMPACTS

CEQ defines cumulative impacts as the “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant past, present, and foreseeable future actions. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

This cumulative impacts analysis summarizes expected environmental impacts from the combined impacts of past, current, and reasonably foreseeable future projects in accordance with CEQ regulations implementing NEPA and CEQ guidance on cumulative effects (CEQ 1997). The geographic scope of the analysis varies by resource area. For example, the geographic scope of cumulative impacts on resources such as soils and vegetation are narrow and focused on the location of the resource. The geographic scope of air quality and wildlife and sensitive species is much broader and considers more county- or region-wide activities. Projects that were considered for this analysis were identified by reviewing CBP documents; news releases and published media reports; the CEQAnet database; and publicly available information and reports from Federal, state, and local agencies. Projects that do not occur in proximity (i.e., within several miles) of the proposed project site would not contribute to a cumulative impact and are generally not evaluated further.

4.1 PAST, PRESENT, AND REASONABLY FORSEEABLE FUTURE ACTIONS

Past actions are those within the cumulative impacts analysis areas that have occurred prior to the development of this EA. The impacts of these past actions are generally described in **Section 3**. Present actions include current or funded construction projects, CBP or other agency operations near the proposed site, and current resource management programs and land use activities within the cumulative impacts analysis areas. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with respect to their effects. The following activities are present or reasonably foreseeable future actions:

Repair/Rebuild to FC-2 Minnewawa Road. The rebuilding and restoration of Minnewawa Road was designed to enhance officer safety by providing a more reliable and safe driving surface. The road is critical to USBP’s ability to maintain visual surveillance and communications capabilities in the vicinity of the project, and the road improvements were needed to ensure that the road is passable and to ensure officers’ safety. The entire 5.23 miles of roadway was rebuilt to FC-2 (all weather road) condition. Activities began November 2016 and the project was completed in November 2017.

Improvement of Otay Truck Trail. Otay Truck Trail East Road was an FC-2 level all-weather road not regularly maintained by CBP. The road had washed out in a number of locations, had lost much of the drain-line ditches, and had a number of potholes as a result of water erosion and road washout. The project included the importing of roadway material to achieve a 6-inch-deep, well-

graded roadbed, shaped with a defined crown section and included parallel ditches and cross culverts to ensure proper drainage both parallel and transverse to the road alignment. The improvement included repairs to 57 existing culverts of either 12, 18, or 24 inches in diameter of corrugated pipe. Some culverts were old and rusted, especially those 12 inches in diameter, and other culverts were clogged and/or collapsed. Activities began in September 2018 and the project was completed in January 2019.

Improvement and Widening of A-1 West Access Road. The project consisted of improving the westernmost 1,800 feet of the existing access road to an A-1 fence and border road. The project improved the road to a 24-foot-wide, all-weather road with appropriate drainage structures, including a low-water crossing and three culverts. The project required minor cut and fill work, grading, and adding an aggregate road base. A new turnaround area and the alignment shift in some sections of the road both caused disturbance outside of the existing road alignment. A utility pole was also relocated to outside the new road alignment. A locking gate along Alta Road at the turnoff to the improved access road was replaced. The project terminated to the west where the access road intersects Alta Road and to the east where it becomes Otay Mountain Truck Trail. The total project disturbance was 6 acres, of which approximately 4 acres were temporary disturbance and approximately 2 acres were permanent disturbance.

Improvement of the A-1 Border Road. The project consisted of improving approximately 5.4 miles of existing FC-3 road to a FC-2 all-weather road. The project also included cleaning out existing drainage ditches adjacent to the A-1 border road and repairing/replacing existing drainage ditches, rip-rap lining at inlet and outlet structures, and other ancillary drainage structures. The combined temporary and permanent footprint of the road improvements was approximately 24 feet wide in most of the project area.

Construction of San Diego Border Fence Replacement. The project replaced approximately 12.5 miles of existing secondary border wall, constructed approximately 1.5 miles of new secondary border wall (14 total miles), installed fiber-optic cable, and constructed an all-weather road along the southwestern border of the United States. The new taller and more substantial bollard-style wall that replaced the secondary wall is critical to prevent illegal entries into the United States and to achieve operational control of the border. The project included design, site preparation and material delivery, removal and replacement of the existing secondary wall, removal and replacement of existing motorized vehicle gates, installation of new fiber-optic cable, installation of grouted rip-rap, and construction of a 40-foot-wide all-weather road with electrical and lighting along 1.5 miles of new section of wall.

Construction of Brown Field Border Patrol Station. For this project, CBP proposed to construct, operate, and maintain a new USBP Brown Field Border Patrol Station on a 125.2-acre government-owned property in Dulzura, San Diego County, California. The project included construction of a main Border Patrol Station building designed to accommodate up to 400 USBP agents and support staff, as well as ancillary support facilities and structures including a vehicle maintenance/all-terrain vehicle storage facility, outdoor tactical support areas, government and privately owned vehicle parking areas, vehicle wash rack, fuel island, canine kennel, communications tower, septic system and leach field, water supply facility, stormwater management system, helipad, roadways, emergency generators, and utilities.

State Route (SR) 905/SR 125/SR 11 Northbound Connector Project. This project is designed to help ease border congestion and facilitate goods movement between the United States and Mexico. New connectors at this critical link in the overall border road network provide direct access to SR 125 from SR 905 and SR 11. SR 905, a new six-lane, 6.4-mile highway that parallels Otay Mesa Road, opened to traffic in July 2012. Construction of the northbound connectors began in October 2015 and opened to traffic November 2016. This connector project is approximately 6 miles from the proposed project site.

SR 11 and Otay Mesa East Port of Entry. The purpose of this project is to meet expected, increased demand and reduce the impacts from idling vehicles at the existing border crossings in the bi-national San Diego-Baja California “mega region.” On both sides of the border, the project will create a network for the POE system that incorporates the latest security technologies with evolving border policies and procedures, including intelligent transportation management strategies, and serve as a model for a safe, secure, and efficient 21st Century POE. Under a plan approved in January 2012 by the California Transportation Commission, the United States portion of the project is being built in three segments. The first segment was completed and opened in 2016. This POE system would be approximately 6 miles from the proposed project site.

SR 94 Improvement Project. Caltrans is the lead agency for the SR 94 Improvement Project, which is funded by Jamul Indian Village and mitigates projected impacts on Highway 94 that are associated with the operation of the Hollywood Casino. The project consists of a series of improvement projects that include realigning and widening Highway 94 from north of Melody Road to south of Reservation Road, and five intersection improvements at Jamacha Boulevard and Jamacha, Steele Canyon, Lyons Valley, and Maxfield roads (Caltrans 2016). However, portions of the SR 94 Improvement Project would be at least 5 miles north of the proposed project site.

4.2 CUMULATIVE ANALYSIS BY RESOURCE AREA

A cumulative impacts analysis must be conducted within the context of the resource areas. The magnitude and context of the impact on a resource area depends on whether the cumulative effects exceed the capacity of a resource to sustain itself and remain productive (CEQ 1997). The following discusses potential cumulative impacts that could occur as a result of implementing Alternative 1 and other past, present, and reasonably foreseeable future actions. No major, adverse, cumulative impacts were identified in the cumulative impacts analysis.

4.2.1 Alternative 1: Proposed Action

Implementation of Alternative 1 (Proposed Action) would ensure that the physical integrity of the existing road and associated supporting elements continue to perform as intended to assist the USBP in securing the U.S./Mexico international border in California. Improvement of the road would enhance agent safety by providing efficient, reliable, and safe driving surfaces for USBP personnel. Alternative 1 would ensure the road is passable, providing faster response times to border incidents in strategically valuable areas. All maintenance and repair activities would occur via a periodic work plan. Implementation of Alternative 1 would not be expected to contribute to significant adverse cumulative effects. However, implementation would be expected to contribute to long-term, beneficial effects when effects from past projects such as Repair/Rebuild to FC-2 Minnewawa Road, Improvement of Otay Truck Trail, Improvement and Widening of A-1 West

Access Road, and Improvement of the A-1 Border Road are taken into account. The combined roadway improvement projects would ensure that roadways used by USBP are passable, providing faster response times to border incidents in strategically valuable areas.

4.2.2 Land Use

Most of the project area is remote and predominately ecological reserve and wildlife refuge, most of which is managed or protected by the Federal government. The maintenance and repair of tactical infrastructure would have no effect on land use plans or policies. Maintenance and repair activities involve work on existing infrastructure, so there would be no change in long-term land uses. Cumulatively, Alternative 1 and other maintenance and repair activities would not contribute to adverse effects on land use.

4.2.3 Geology and Soils

The potential for effects on geology and soils is limited to areas where ground disturbance would occur within the project area. The adoption of appropriate BMPs and proposed schedule for maintenance would ensure that erosion would be minimized, and erosion-creating activities well dispersed throughout the area avoiding any pockets of intense activity. Cumulatively, this approach reduces the impacts of any ad hoc approach applied to past maintenance and repair activities and ensures future potential erosion is well-managed.

Consequently, the maintenance and repair of 1418 Firebreak Road combined with other present construction activity, including Construction of Brown Field Border Patrol Station, SR 94 Improvement Project, and State Route 11 and Otay Mesa East Port of Entry, would be expected to result in short-term, minor, adverse effects that are localized to the areas where ground disturbance has occurred. Long-term, beneficial effects would be expected from stabilization of the roadway and drainage structures in the project area.

4.2.4 Vegetation

Minor to moderate effects on native species vegetation and habitat and introduction of non-native species are observable from past and present development and land use. However, Alternative 1 does not involve new development activities, and effects on vegetation are generally limited to the existing footprint of the roadway. Selective maintenance and repair activities would be expected to result in generally negligible adverse effects on terrestrial and aquatic vegetation. Under the work plan, BMPs would ensure impacts on vegetation including the introduction of non-native species would be minimized, and consequently the cumulative effects on vegetation resources would be considered negligible.

4.2.5 Terrestrial Wildlife Resources

Minor to moderate effects on wildlife species have occurred from the additive effects of past and present actions, although there is quality habitat surrounding the project area to support wildlife. Alternative 1 does not involve new development activities, and effects on wildlife and aquatic species are limited to the existing footprint and immediately surrounding areas. Maintenance and repair activities would be expected to result in generally negligible, adverse effects on wildlife and

aquatic species. Operation of heavy equipment would generate temporary noise and could displace wildlife species. Under the work plan, BMPs would ensure impacts on terrestrial and aquatic wildlife resources would be minimized and therefore the cumulative impacts on terrestrial and aquatic wildlife resources would also be considered to be negligible in effect.

4.2.6 Threatened and Endangered Species

As discussed in **Section 3.6**, CBP will consult with USFWS under Section 7 of the ESA regarding potential effects on listed species and designated critical habitat. Potential direct and indirect effects on federally listed species presented in this EA are based on currently available data. A separate effects analysis is developed under NEPA, but parallels impact determinations made for the Section 7 consultation process. The designation of threatened or endangered implies that past activities have had major adverse effects on these species.

There are three federally listed threatened or endangered plant or animal species that are known to occur within the region of analysis and one other federally listed species that has a high potential to occur in the project area. **Section 3.6** presents detailed discussions for each of these species. Cumulatively, present and future activities are likely to continue to affect threatened and endangered species. Potential threats include habitat loss from urbanization and road construction, trampling of protected plants, corridor fragmentation, and noise from increasingly urban areas. The ESA will continue to protect threatened and endangered species and designated critical habitat with the goal of recovery. Short-term, cumulative adverse impacts from Construction of Brown Field Border Patrol Station, SR 94 Improvement Project, and State Route 11 and Otay Mesa East Port of Entry would be expected, as construction for all four projects would be occurring at the same time. However, cumulatively, Alternative 1 would be expected to have negligible to moderate contributions to adverse effects on threatened and endangered species.

4.2.7 Hydrology and Groundwater

Water quality of the Imperial Valley Groundwater Basin, the main aquifer in the project area, has historically been adversely affected by surrounding land uses and water withdrawals. Alternative 1 does not involve new development activities; negligible, indirect, adverse effects could occur on hydrology and groundwater systems from the maintenance and repair of roadways and drainage management structures. Cumulatively, effects on hydrology and groundwater from the maintenance and repair of the roadway in addition to other projects would also be negligible.

4.2.8 Surface Waters and Waters of the United States

Surface water quality of sub-watersheds within the project area have historically been significantly affected by various inputs including urban, agricultural and livestock runoff, and septic, wastewater, and industrial discharges. Some surface water bodies are consequently on USEPA's 303(d) list of impaired waters, as discussed in **Section 3.8** (USEPA 2010d). Historically significant wetland losses have resulted from draining, dredging, filling, leveling, and flooding for agricultural and urban development. California has lost as much as 91 percent of its original wetlands, primarily from conversion to agriculture (USGS 1996).

Alternative 1 does not involve new development activities, but negligible, indirect, adverse effects could occur on surface waters from the maintenance and repair of the roadway and drainage management structures. Under the work plan, BMPs would ensure impacts on surface water and ephemeral drainages are minimized. Cumulatively, effects on surface waters and Waters of the United States from the maintenance and repair of the roadway would be negligible in the short-term but with the consistent observance of the work plan could result in long-term, minor, beneficial impacts on surface water quality.

4.2.9 Floodplains

Floodplain resources can be adversely impacted by development, increases in impervious areas, loss of vegetation, hydrological changes, and soil compaction. Historically, natural floodplains have been permanently altered by development activities and the construction of canals and reservoirs. Alternative 1 does not involve new development activities and would have no direct effects on floodplains. Clearing of vegetation and removal of debris could result in increased sedimentation into floodplains and drainage structures, but this would be a negligible indirect effect. Cumulatively, effects on floodplains from the maintenance and repair of the roadway, in addition to other projects, would be negligible.

4.2.10 Air Quality

USBP San Diego Sector operates within an AQCR that is in nonattainment for one or more criteria pollutants. Alternative 1 would have short-term, negligible, localized, adverse effects on air quality during maintenance and repair activities. The adoption of appropriate BMPs and proposed schedule for maintenance would ensure that dust creation would be minimized. Cumulative effects on local and regional air quality from the maintenance and repair of the roadway, in addition to other projects, would be negligible.

4.2.11 Noise

Cumulative effects on the noise environment occur when a project has noise emissions that are noticeably loud or that raise ambient noise levels. New noise sources are generally more noticeable in areas that have lower ambient noise levels. Cumulative effects on noise would only be expected where multiple projects are occurring at the same time and in the same vicinity because noise attenuates over distance. Short-term, cumulative adverse impacts from Construction of Brown Field Border Patrol Station, SR 94 Improvement Project, and State Route 11 and Otay Mesa East Port of Entry would be expected as construction for all four projects would be occurring at the same time.

Alternative 1 would have short-term, negligible to minor, localized adverse effects as a result of the operation of heavy machinery to maintain and repair the roadway. Maintenance and repair of roadway in remote areas would be distant from most other substantial noise-generating activities, so there is little potential for cumulative effects. Increased noise from operation of machinery could combine with existing noise sources or other construction-type activities to produce a temporary cumulative effect on sensitive noise receptors. The adoption of appropriate BMPs and proposed schedule for maintenance would ensure that noise would be minimized. Consequently, existing noise sources would continue to dominate the noise environment and, cumulatively, effects on the

noise environment from maintenance and repair of the roadway, in addition to other projects, would be negligible to minor.

4.2.12 Cultural Resources

Historically, long-term, major, adverse effects on cultural resources have likely occurred from the destruction or alteration of resources before their significance was realized. Tactical infrastructure construction for those projects identified in **Section 1.1** was performed under the supervision of cultural resources specialists to ensure known cultural resources would be protected and that any unanticipated discoveries would be identified and coordinated with the appropriate Federal, state, or tribal parties. The cumulative effects on cultural resources from the maintenance and repair of past, present, and foreseeable future tactical infrastructure projects when considered in conjunction with Alternative 1 would be negligible since all activity would occur within previously disturbed or environmentally cleared footprints.

4.2.13 Recreation and Access

Alternative 1 would temporarily close 1418 Firebreak Road to the public. Short-term, minor to moderate impacts would occur from the temporary closure of the road as individuals would no longer be allowed to use the area near the gate as a parking lot. Long-term, negligible to minor impacts would occur from the improvement of the roadway. Improvement of the road could draw more individuals to use 1418 Firebreak Road for access to these public lands for recreation. Cumulatively, effects on recreation and access from the maintenance and repair of the roadway would be minor to moderate when combined with possible impacts from other projects occurring at the same time, including Construction of Brown Field Border Patrol Station, SR 94 Improvement Project, and State Route 11 and Otay Mesa East Port of Entry.

4.2.14 No Action Alternative

Under the No Action Alternative, CBP would not be maintaining, repairing, and improving the road. As discussed in **Section 3**, generally, the No Action Alternative would be expected to have no impacts on soils, vegetation, terrestrial and aquatic wildlife, threatened and endangered species, groundwater, surface water and Waters of the United States, floodplains, air quality, noise, cultural resources, or recreation and access. Under the No Action Alternative, maintenance and repair work would not be completed. Under such conditions, there is also a greater likelihood of road degradation occurring beyond the proposed footprint with a corresponding potential to adversely affect cultural resources and species habitat that have not been previously surveyed. Effects on land use under the No Action Alternative would be the same as effects under Alternative 1.

Cumulative effects on soils, vegetation, terrestrial and aquatic wildlife, threatened and endangered species, groundwater, surface water and Waters of the United States, floodplains, air quality, noise, cultural resources, and recreation and access under the No Action Alternative would be expected to be less adverse than those discussed under Alternative 1. Cumulative effects on land use would be essentially the same as those discussed under Alternative 1. Implementation of the No Action Alternative would not, however, be expected to contribute to significant adverse, cumulative effects when considered with other recently completed or planned future projects in the project area.

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APPENDIX A

Road Classifications



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APPENDIX A

Road Classifications and Maintenance and Repair Standards

Introduction

Firebreak Road would be maintained in accordance with proven maintenance and repair standards. All of the standards CBP is adopting are developed based on comprehensive engineering analysis, proven BMPs adopted by other Federal agencies, and mitigation measures derived from extensive consultation with both regulatory and resources agencies. Below is a description of road classifications and maintenance and repair standards.

Road Classification

CBP has developed a road classification system whereby roads are maintained to specific standards dependent upon their classification. Under the CBP classification system, five standards for roads have been developed:

- *FC-1 Paved Road* – Paved, all-weather road constructed of any material. Road is two lane with a total road width of 24 feet (see **Figures A-1 and A-2**).
- *FC-2 All-Weather Road* – Unpaved, all-weather road consisting of a surface of imported aggregate material such as milled bituminous material or processed stone and gravel. Road is two-lane with a total road width of 24 feet (see **Figures A-3 and A-4**).
- *FC-3 Graded Earth Road* – Unpaved road constructed of graded, native material. Road is two-lane with a total road width of 20 feet (see **Figures A-5 and A-6**).
- *FC-4 Two-Track Road* – Unpaved road on natural ground consisting of a single lane with an overall road width of 10 feet (see **Figures A-7 and A-8**).
- *FC-5 Sand Road* – Unpaved, sand road consisting of natural ground conditions, two lanes, and an overall road width of 16 to 18 feet (see **Figures A-9 and A-10**).

Road Maintenance and Repair

The maintenance and repair of FC-1 and FC-2 roads within state, county, or municipal government's purview is completed by their transportation departments. Maintenance and repair of FC-1 and FC-2 roads located on Federal land are maintained in coordination and performed where necessary by agreement with the appropriate Federal agency. In general, CBP would adhere to U.S. Forest Service (USFS) standards for road maintenance, which have been tried and proven over many years and in a variety of environmental conditions.

Some of the road is on Federal lands (e.g., BLM, USFWS) and is the responsibility of CBP to maintain and repair. In the few instances where CBP is required to maintain FC-1 and FC-2 roads, maintenance and repair would be restricted to minor resurfacing to address potholes in paved surfaces and rutting and raveling in all-weather roads. Minor work to shoulder areas of these roads would also be required to maintain the integrity of the road surfaces and road beds.



Figure A-1. FC-1 Paved Road (Photograph)

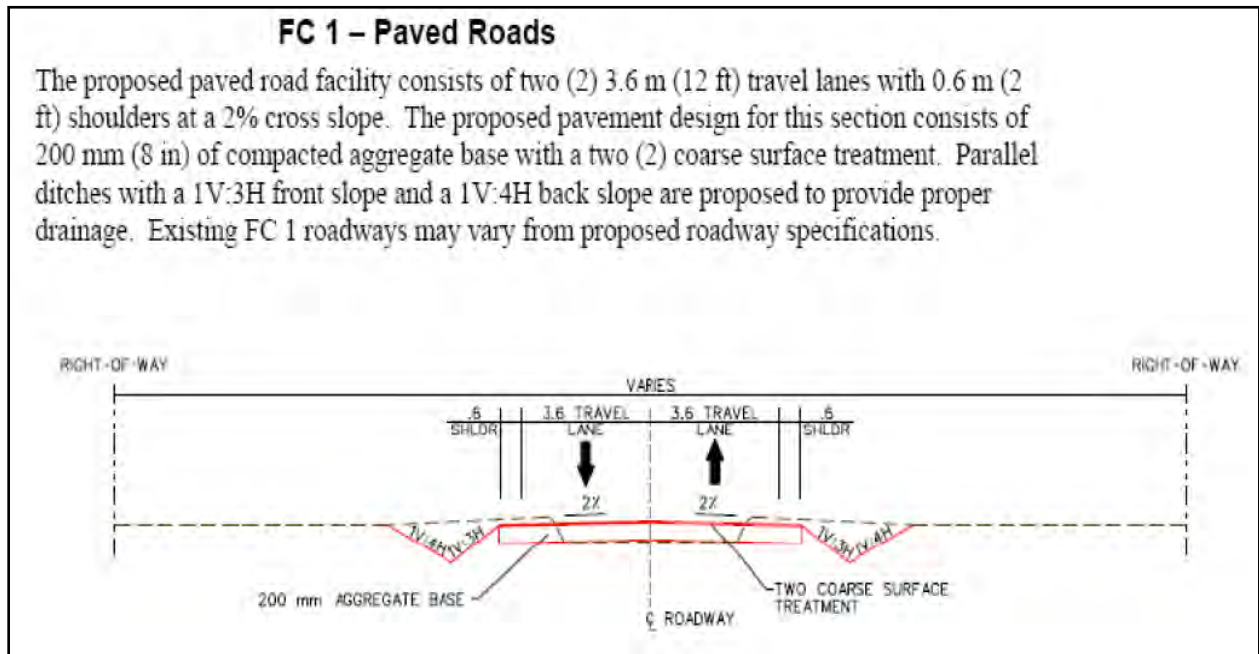


Figure A-2. FC-1 Paved Road (Diagram)



Figure A-3. FC-2 All-Weather Road (Photograph)

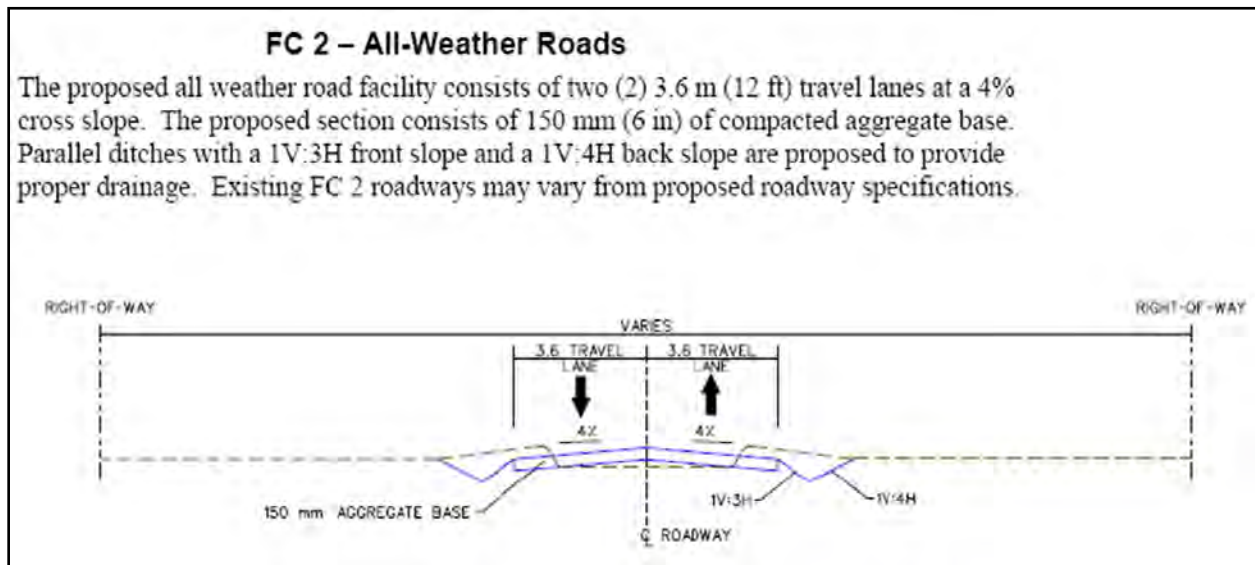


Figure A-4. FC-2 All-Weather Road (Diagram)



Figure A-5. FC-3 Graded Earth Road (Photograph)

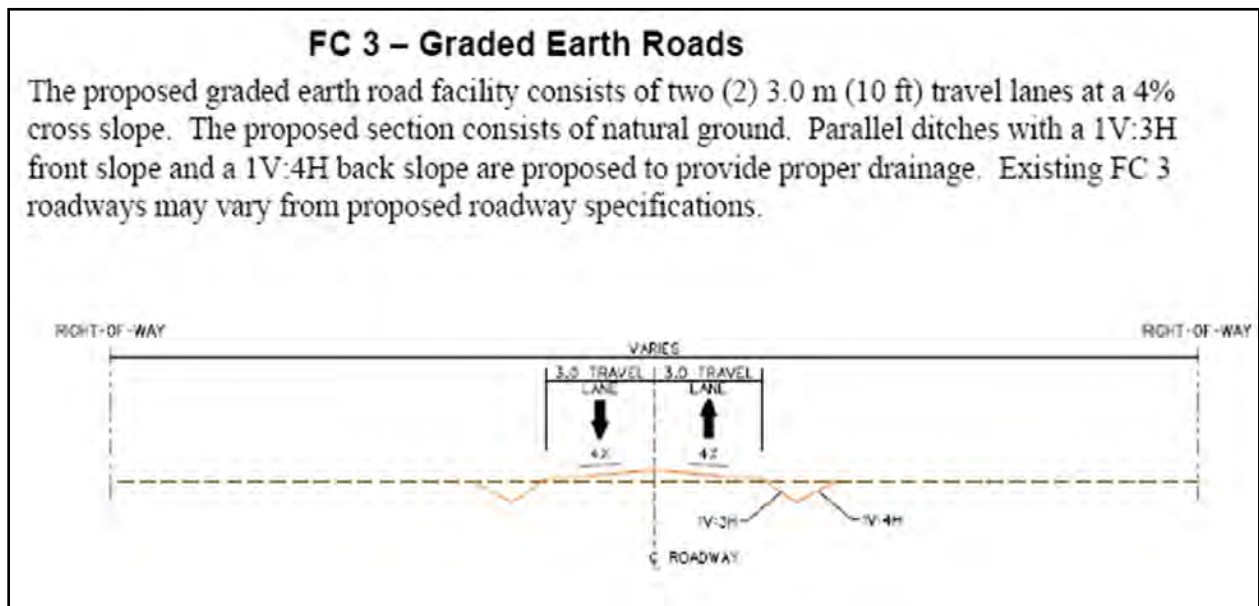


Figure A-6. FC-3 Graded Road (Diagram)



Figure A-7. FC-4 Two-Track Road (Photograph)

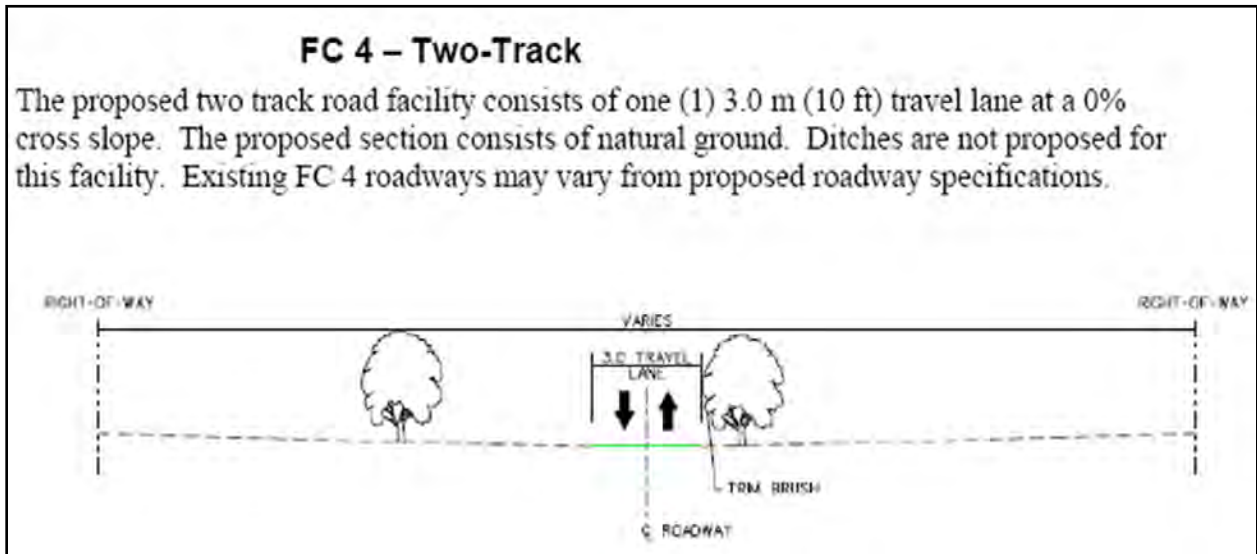


Figure A-8. FC-4 Two-Track Road (Diagram)



Figure A-9. FC-5 Sand Road (Photograph)

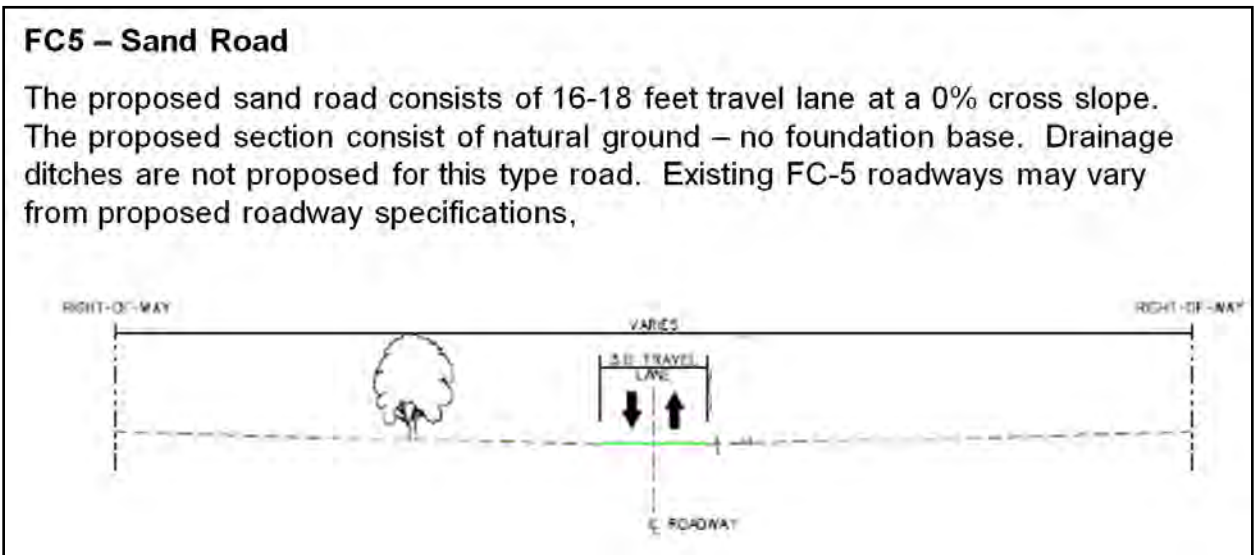


Figure A-10. FC-5 Sand Road (Diagram)

Because of their lack of formal construction design, FC-3 and FC-4 roadways are subject to the greatest deterioration if left unmaintained. When subjected to heavier traffic, rutting occurs, which in turn is exacerbated by rain events that further erode the surface. Unmanaged storm water flow also causes general erosion to occur, washing out complete sections of road and in many instances making roads impassable.

As the two track name implies, FC-4 roads consist of two parallel tracks created by the loss of vegetation where the tires contact and compact the earth; between which may lay a strip of low-growth vegetation. These roads receive very little maintenance consisting primarily of occasional brush and boulder clearing, and possibly but much less frequently grading with small tractor mounted box blades. Two-track roads have no crown, and generally do not have any improved drainage features or ditches, although culverts and low water crossings may be installed where continuous erosion issues occur.

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APPENDIX B

Public Involvement Materials



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APPENDIX B

Public Involvement Materials

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APPENDIX C

Applicable Laws, Regulations, and Executive Orders



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APPENDIX C

Applicable Laws, Regulations, and Executive Orders

Table C-1. Applicable Laws and Executive Orders ¹

Title, Citation	Summary
American Indian Religious Freedom Act, 42 U.S.C. § 1996	Requires policies of all governmental agencies to eliminate interference with the free exercise of Native American religions, based upon the First Amendment to the United States Constitution, and to accommodate access to, and use of, Native American religious sites to the extent that the use is practicable and is consistent with an agency's essential functions. Also acknowledges the prior violation of that right.
Archaeological Resources Protection Act, 16 U.S.C. §§ 470aa–470mm	Regulates access to archaeological resources on Federal and Indian lands. Forbids excavating or removing archaeological resources from Federal or Indian land without a permit from a land managing agency as well as forbidding any sales, purchase, exchange, transport, or receipt of resources.
Archeological and Historic Preservation Act, 16 U.S.C.469-469c	Protects and preserves historical and archaeological data. Requires Federal agencies to identify and recover data from archaeological sites threatened by a proposed action(s).
California Code, Public Resources Code, PRC § 5097.98	States when the commission receives notification of a discovery of Native American human remains from a county coroner pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, it shall immediately notify those persons it believes to be most likely descended from the deceased Native American.
California Endangered Species Act, Fish and Game Code Sections 2050-2116	States all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved.
California Environmental Quality Act, California Public Resources Code Sections 21000–21177 40 CFR Part 1508.27	Requires the State of California and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. Applies to any discretionary action by a state or local agency and projects that have the potential to result in a physical change to the environment or that might be subject to several discretionary approvals by governmental agencies, including construction activities, clearing of or grading land, improvements to existing structures, and activities or equipment involving the issuance of a permit.
Clean Air Act, 42 U.S.C. 7401–7671q, as amended	Establishes Federal standards for air pollutants. Prevents significant deterioration in areas of the country where air quality fails to meet Federal standards.
Clean Water Act, 33 U.S.C. 1251–1387	Comprehensively restores and maintains the chemical, physical, and biological integrity of the nation’s waters. Implemented and enforced by the U.S. Environmental Protection Agency (USEPA).

Title, Citation	Summary
Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601–9675	Provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and cleanup of inactive hazardous substance disposal sites. Establishes a fund financed by hazardous waste generators to support cleanup and response actions.
E.O. 11990, <i>Protection of Wetlands</i> , May 24, 1977, 42 FR 26961	States to the extent possible the short- and long-term, adverse impacts associated with the destruction or modification of wetlands should be avoided as well as direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
E.O. 12088, <i>Federal Compliance with Pollution Control Standards</i> , as amended, October 13, 1978, 43 FR 47707	Directs Federal agencies to (1) comply with “applicable pollution control standards,” in the prevention, control, and abatement of environmental pollution; and (2) consult with the U.S. Environmental Protection Agency (USEPA), state, interstate, and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution.
E.O. 13514, <i>Federal Leadership in Environmental, Energy, and Economic Performance</i> , October 5, 2009, 74 FR 52117	Directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources.
E.O. 11988, <i>Floodplain Management</i> , May 24, 1977, 42 FR 26971	Requires Federal agencies to determine whether a proposed action would occur within a floodplain and directs Federal agencies to avoid such floodplains unless the agency determines that there is no practicable alternative.
Endangered Species Act of 1973, 16 U.S.C. 1531–1543, as amended	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Prohibits Federal action that jeopardizes the continued existence of endangered or threatened species. Requires consultation with U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries and a biological assessment when such species are present in an area affected by Federal government activities.
Farmland Protection Policy Act, 7 U.S.C. 4201 et seq, as amended	Minimized the effect of Federal programs on the unnecessary and irreversible conversion of farmland to nonagricultural uses.
Federal Insecticide, Fungicide, and Rodenticide Act, 40 CFR Parts 150–189	Provides for Federal regulation of pesticide distribution, sale, and use.
Guidelines for Implementation of the CEQA, California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387	Ensures that decisions are made in accordance with the policies and procedures of the California Environmental Quality Act (CEQA).
Health and Safety Code, Section 7050.5	States that any person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor.

Title, Citation	Summary
Implementing the National Environmental Policy Act, Instructional Manual 023-01-001-01, Rev. 01	Ensures that decisions are made in accordance with the policies and procedures of the National Environmental Policy Act (NEPA) of 1969, as amended.
Migratory Bird Treaty Act, 16 U.S.C. 703–712	Implements various treaties for protecting migratory birds; the taking, killing, or possession of migratory birds is unlawful.
National Environmental Policy Act of 1969, 42 U.S.C. 4321–4347, as amended	Requires Federal agencies to use a systematic approach when assessing environmental impacts of government activities. Proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts to the environment.
National Historic Preservation Act, 16 U.S.C. 470–470x-6	Requires Federal agencies to consider the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object eligible for inclusion, or listed in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through NRHP listing), and protection of significant historical and cultural properties.
Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001-3013	Provides a process for museums and Federal agencies to return certain Native American cultural items—human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations.
Noise Control Act of 1972, 42 U.S.C. 4901–4918	Establishes a national policy to promote an environment free from noise that jeopardizes health and welfare. Authorizes the establishment of Federal noise emissions standards and provides relevant information to the public.
Otay Mountain Wilderness Act of 1999, Public Law 106 - 145	Recognizes that, because of the Wilderness Area's proximity to the U.S.-Mexican international border, drug interdiction, border operations, and wildland fire management operations need to continue so long as they are conducted in accordance with the Wilderness Act and any conditions the Secretary of the Interior considers appropriate. Declares that such designation is not intended to lead to the creation of protective buffer zones around the Wilderness.
Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR Parts 1500–1508	Provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended.
Regulations for Protection of Historic Properties, 36 CFR Part 800	Presents a process for Federal agencies to consult with the appropriate State Historic Preservation Officer (SHPO), Native American groups, other interested parties, and when appropriate, the Advisory Council on Historic Preservation (ACHP). Ensures that the impacts from the undertaking are adequately considered on historic properties.
Resource Conservation and Recovery Act, 42 U.S.C. 6901–6992k	Establishes requirements for safely managing and disposing of solid and hazardous waste and underground storage tanks.

Title, Citation	Summary
Rivers and Harbors Act of 1899 Section 10, 33 U.S.C. 403	Recognizes the act of discharging refuse matter of any kind into the navigable waters, or tributaries thereof, of the United States without a permit as a misdemeanor. Recognizes the act of excavating, filling, or altering the course, condition, or capacity of any port, harbor, channel, or other areas within the reach of the Act without a permit as a misdemeanor. States damming navigable streams without a license or permit from Congress is illegal.
San Diego County Code of Regulatory Ordinances relating to Noise Control and Abatement, Section 1. Title 3, Division 6, Chapter 4 of the San Diego County Code of Regulatory Ordinances	Establishes a policy to promote an environment free from noise that jeopardizes health and welfare in California.
Wilderness Act, 16 U.S.C. 1131 et seq.	Created the legal definition of wilderness in the United States and protected 9.1 million acres of Federal land.

Note:

1. This table only reflects those laws and EOs that might reasonably be expected to apply to the Proposed Action and alternatives addressed in this EA.

Other laws and Executive Orders potentially relevant to this EA include, but are not limited to, the following:

- San Diego County General Plan/Otay Subregional Plan
- San Diego County Zoning Ordinance
- San Diego County Board of Supervisors Policies

APPENDIX D

Water Bar and Water Cutout Location Photographs



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APPENDIX D

Water Bar and Water Cutout Location Photographs

1418 FIREBREAK ROAD - REFERENCE PHOTOS



Waterbar 1 (WB1)



Waterbar 2 (WB2)



Waterbar 3 (WB3)



Waterbar 4 (WB4)



Water Cutout 1 (WC1)



Waterbar 5 (WB5)

NOTES:

5/20/2020

1418 FIREBREAK ROAD - REFERENCE PHOTOS



Water Cutout (WC2)



Passing Zone 1 (PZ1)



Water Cutout 3 (WC3)



Waterbar 6 (WB6)



Water Cutout 4 (WC4)



Water Cutout 5 (WC5)

NOTES:

5/20/2020

1418 FIREBREAK ROAD - REFERENCE PHOTOS



Waterbar (WB7)



Water Cutout (WC6)



Water Cutout 7 (WC7)



Passing Zone 2 (PZ2)



Water Cutout 8 (WC8)



Water Cutout 9 (WC9)

NOTES:

5/20/2020

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APPENDIX E

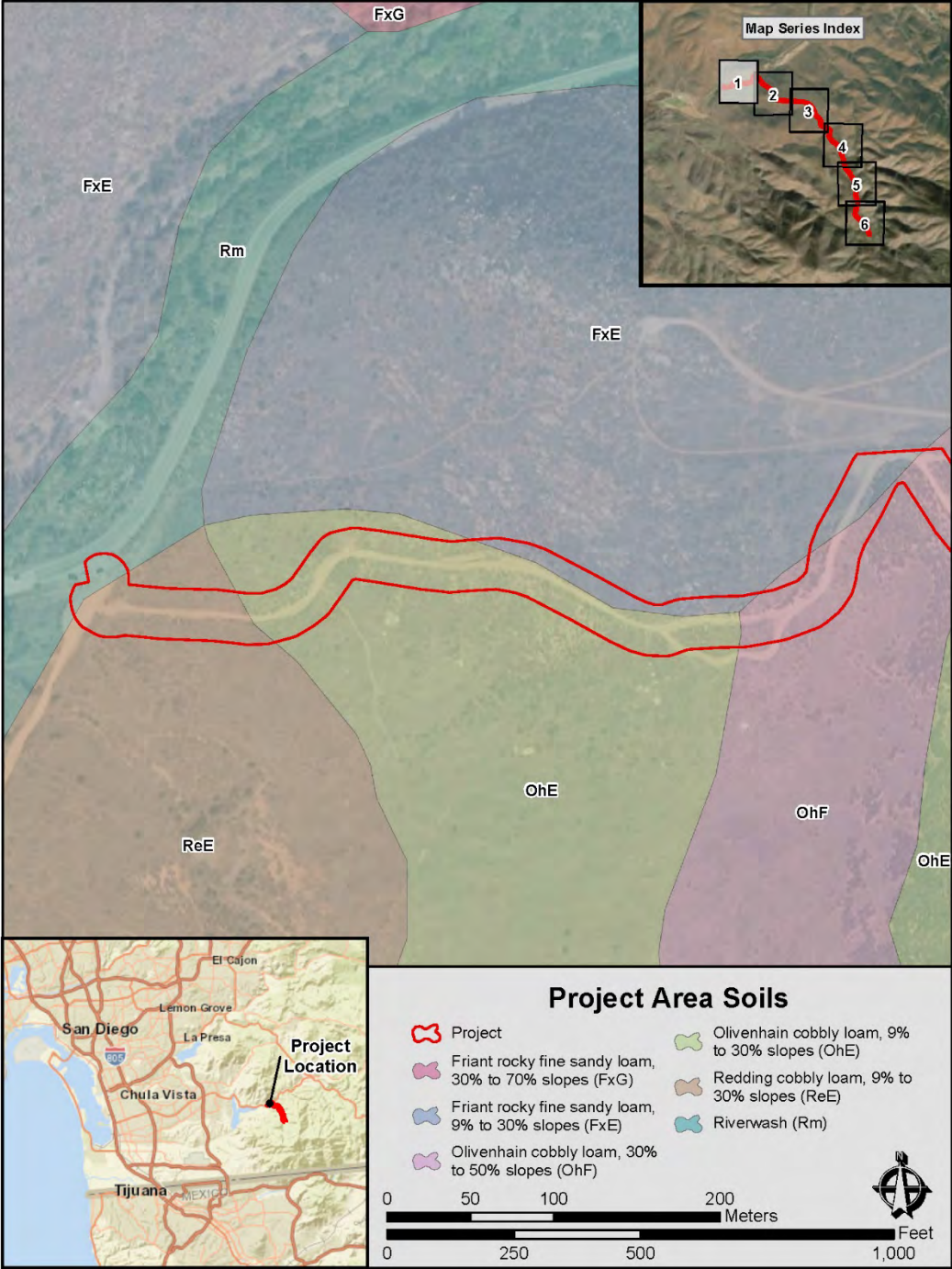
Soil Maps

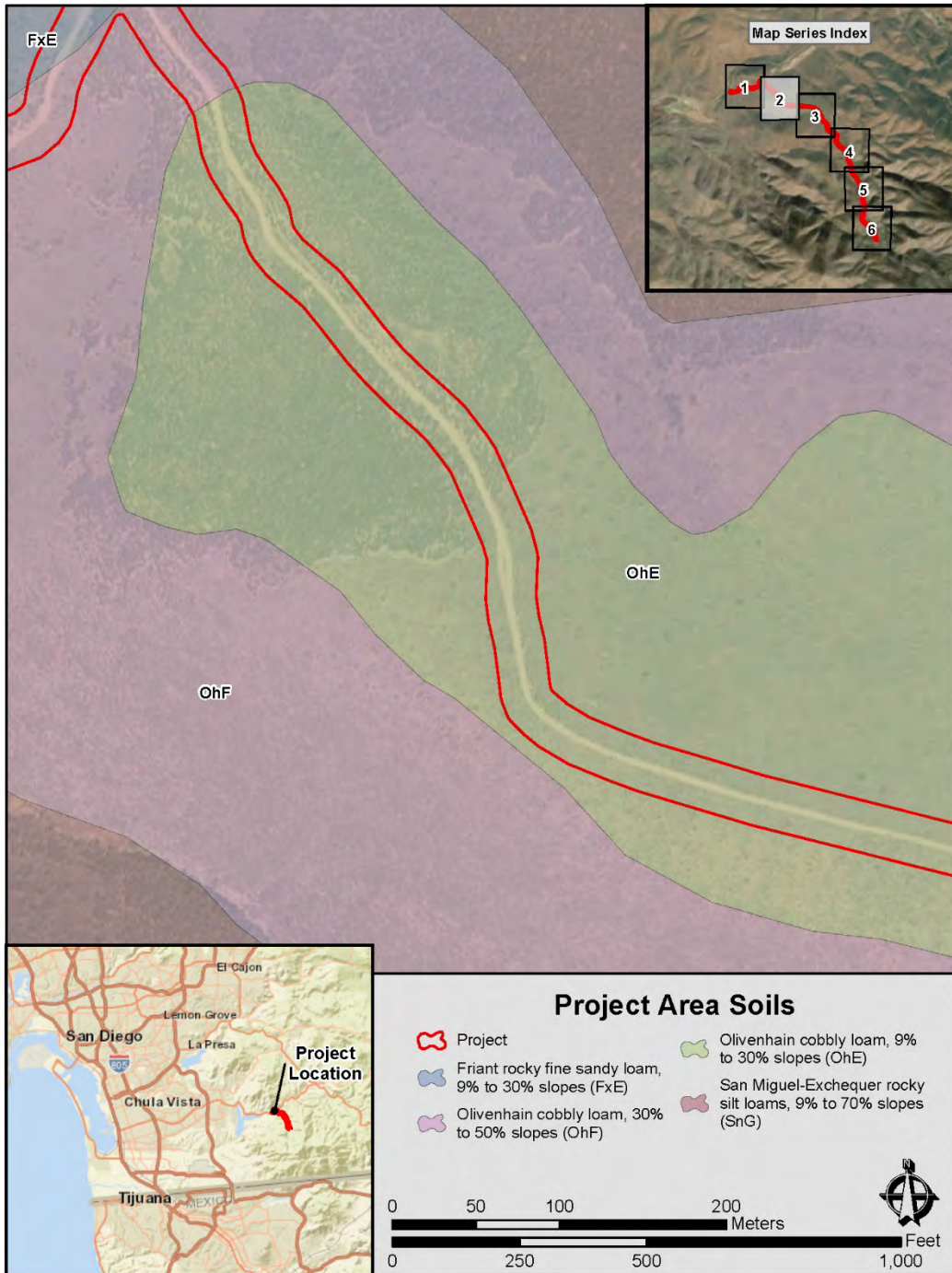


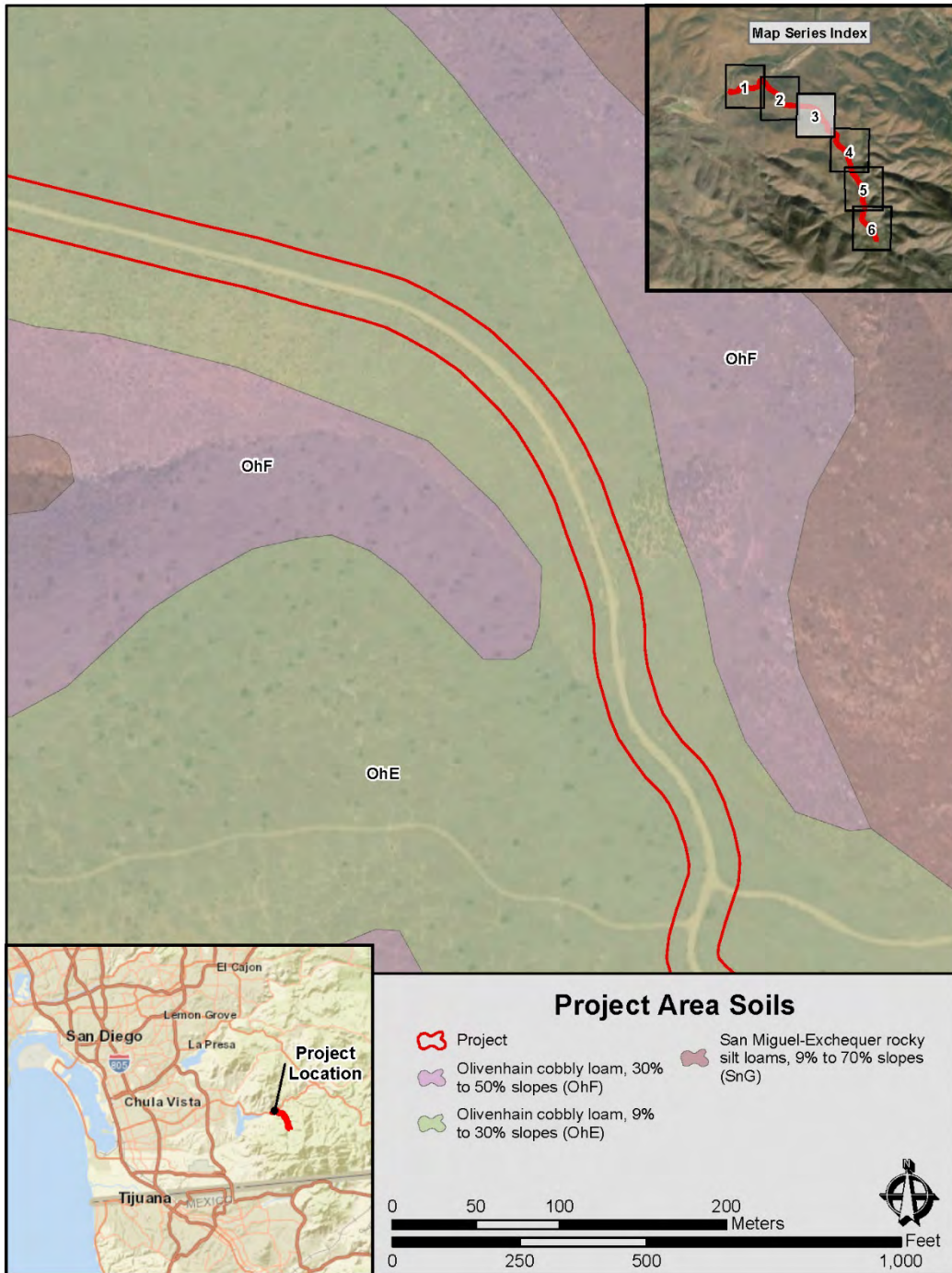
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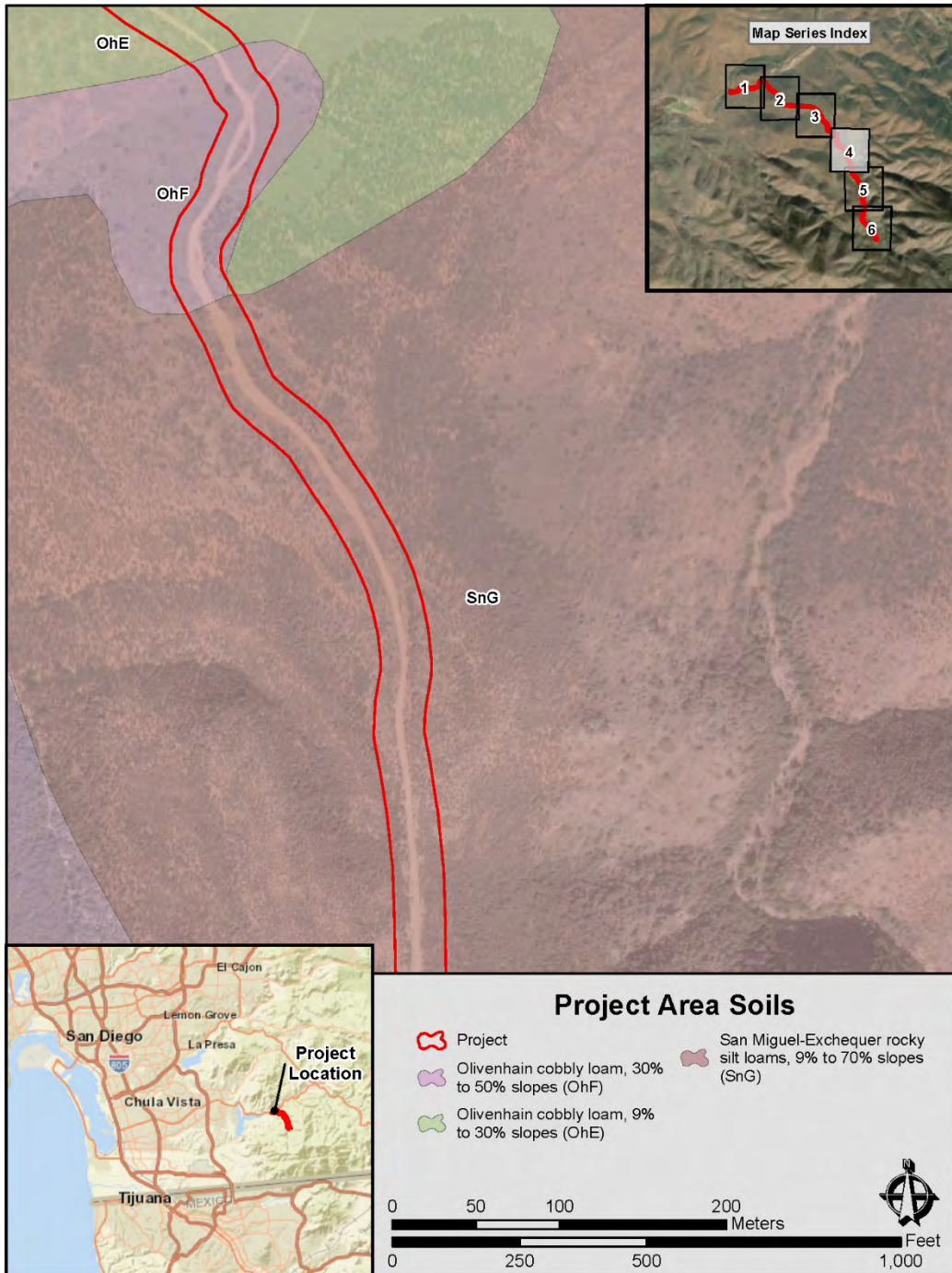
APPENDIX E

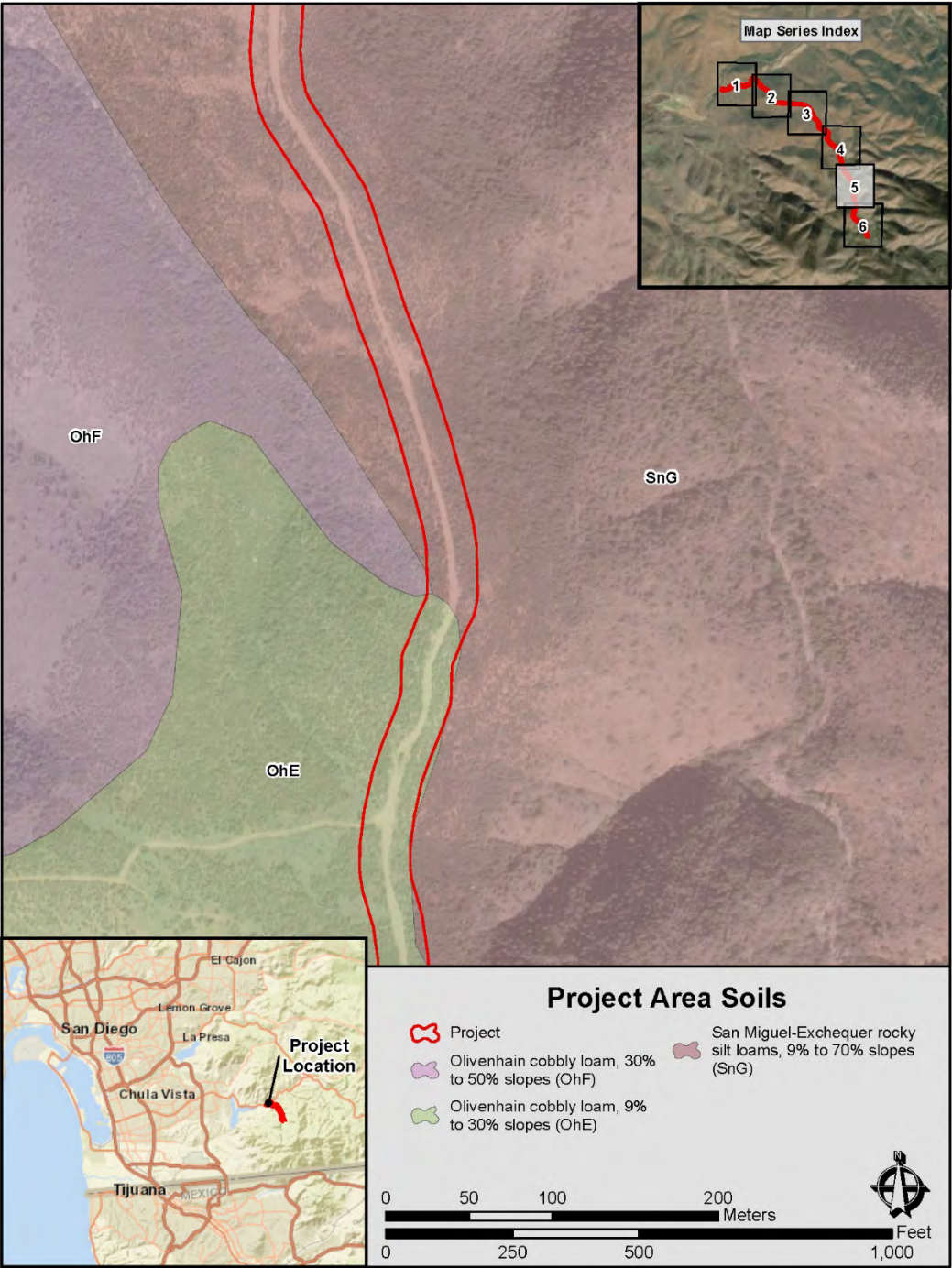
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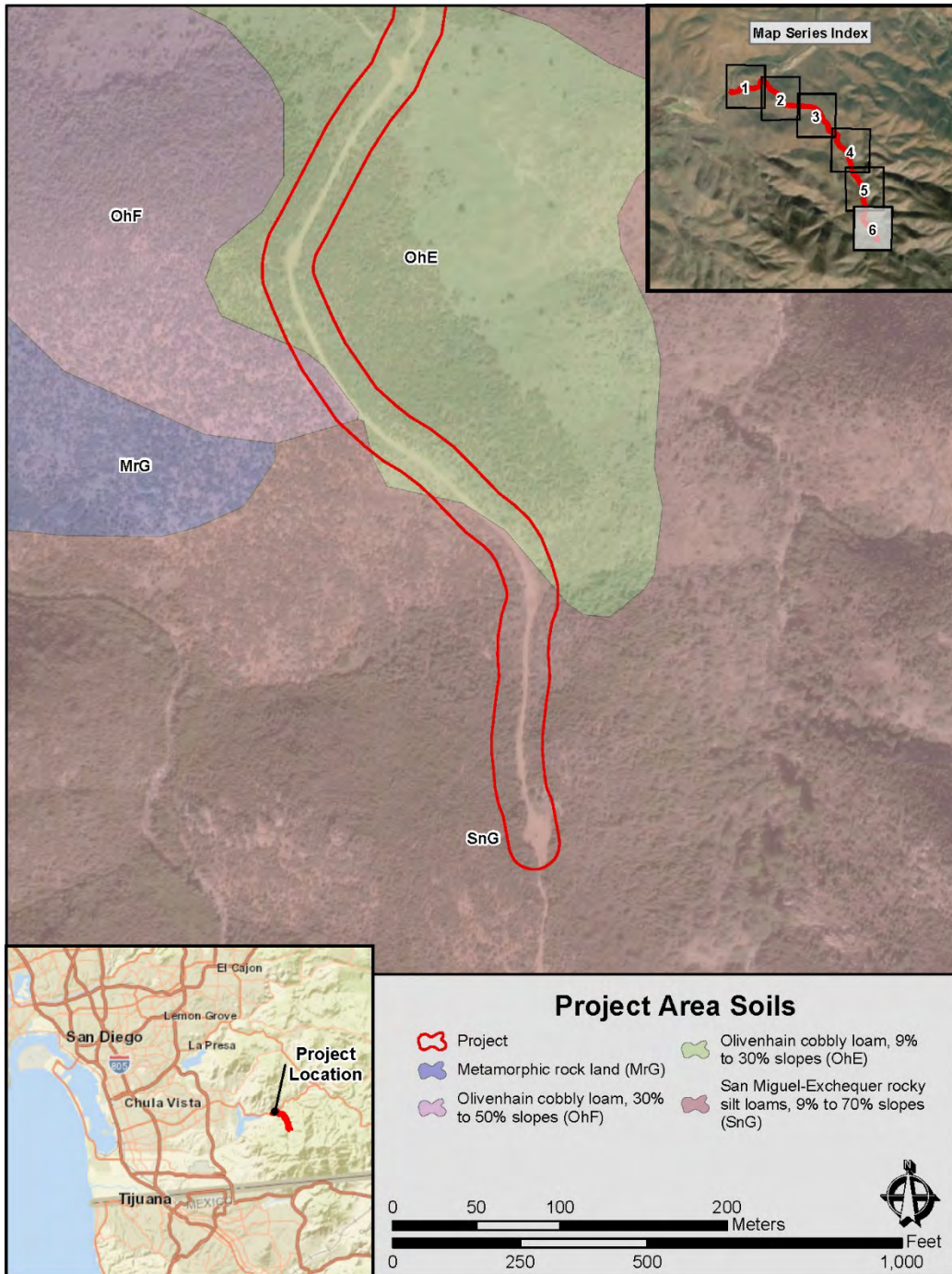












APPENDIX F

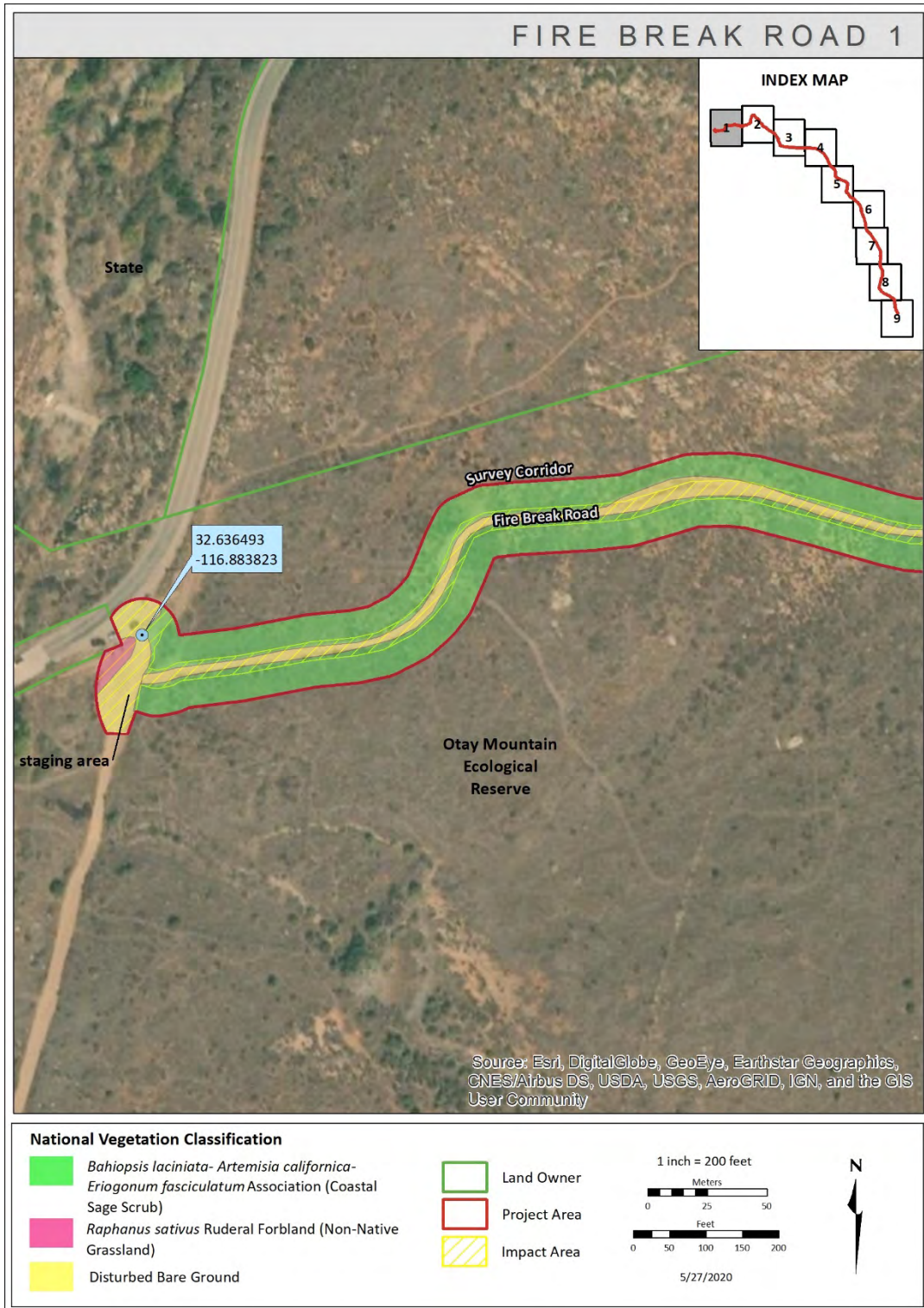
Vegetative Community Maps



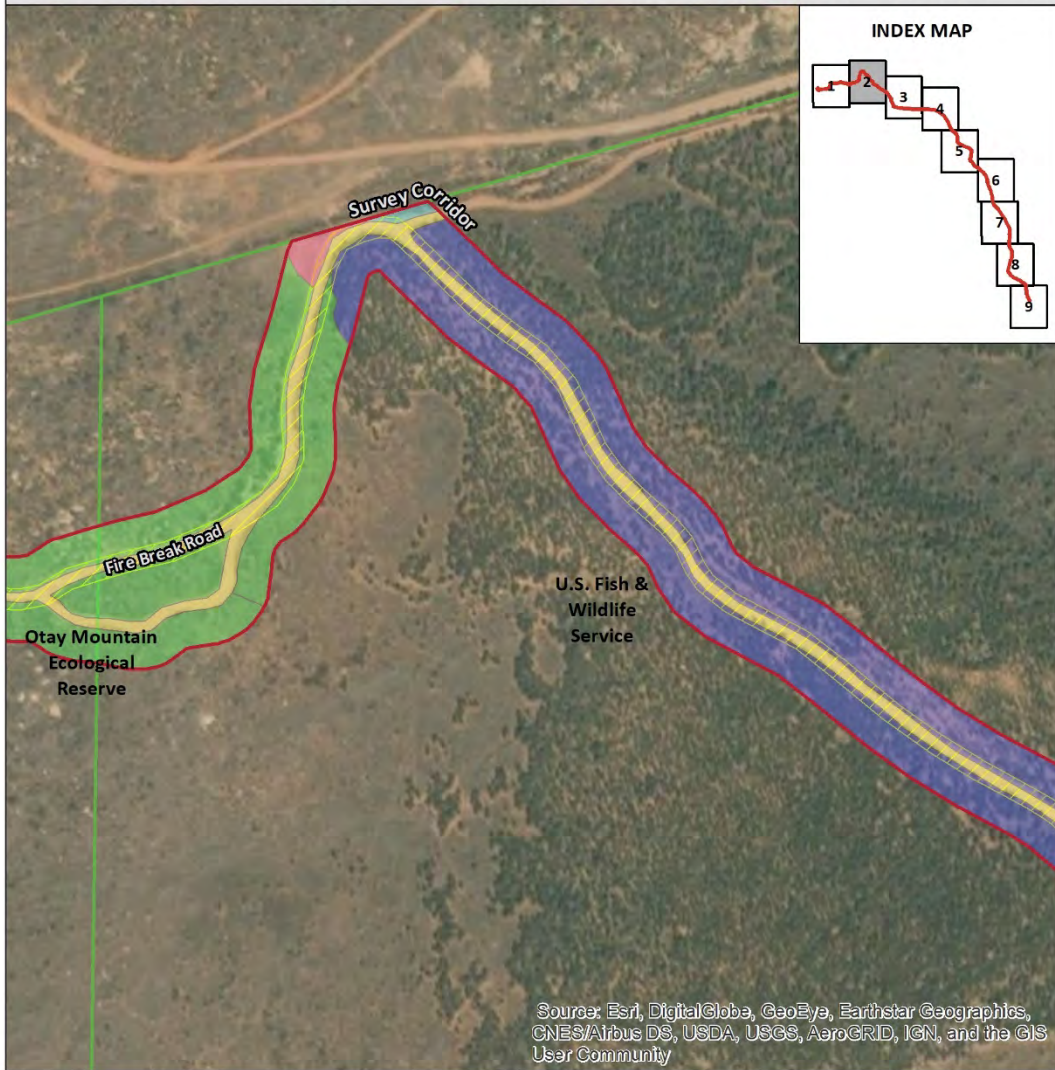
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APPENDIX F









Vegetative Community Maps

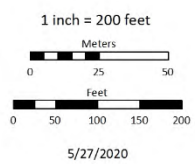


FIRE BREAK ROAD 2

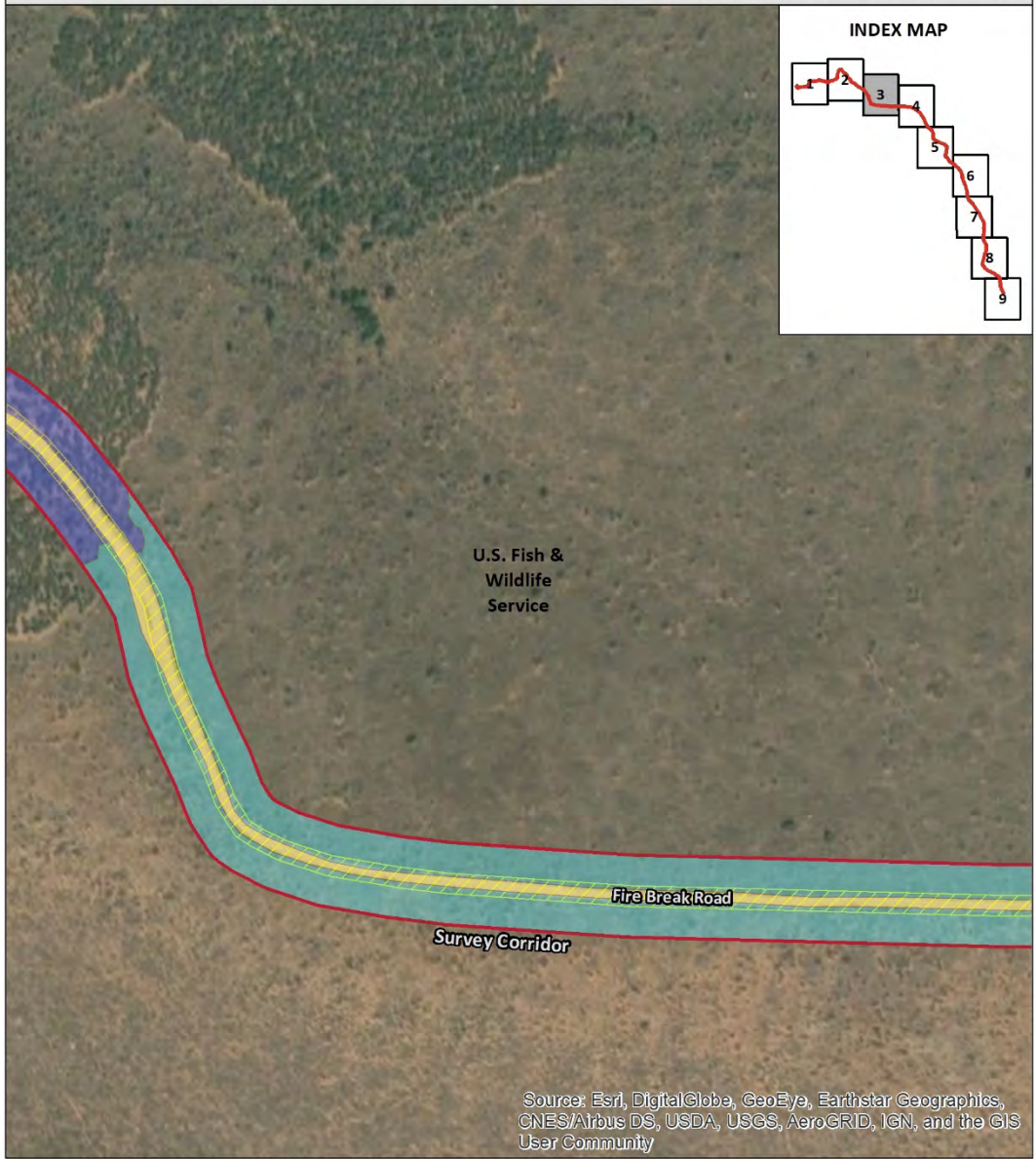


National Vegetation Classification




- | | | | |
|---|---|---|-----------------------|
|  | <i>Bahiopsis laciniosa</i> - <i>Artemisia californica</i> -
<i>Eriogonum fasciculatum</i> Association (Coastal Sage Scrub) |  | Disturbed Bare Ground |
|  | <i>Adenostema fasciculatum</i> - <i>Xylococcus bicolor</i> -
<i>Ceanothus tomentosus</i> Association (Chamise Chapparral) |  | Land Owner |
|  | Mediterranean California Naturalized Annual and Perennial grassland Semi- Natural Stands (Non-Native Grassland/ Coastal Sage Scrub) |  | Project Area |
|  | Mediterranean California Naturalized Annual and Perennial grassland Semi- Natural Stands (Non-Native Grassland) |  | Impact Area |



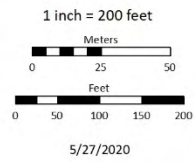
FIRE BREAK ROAD 3



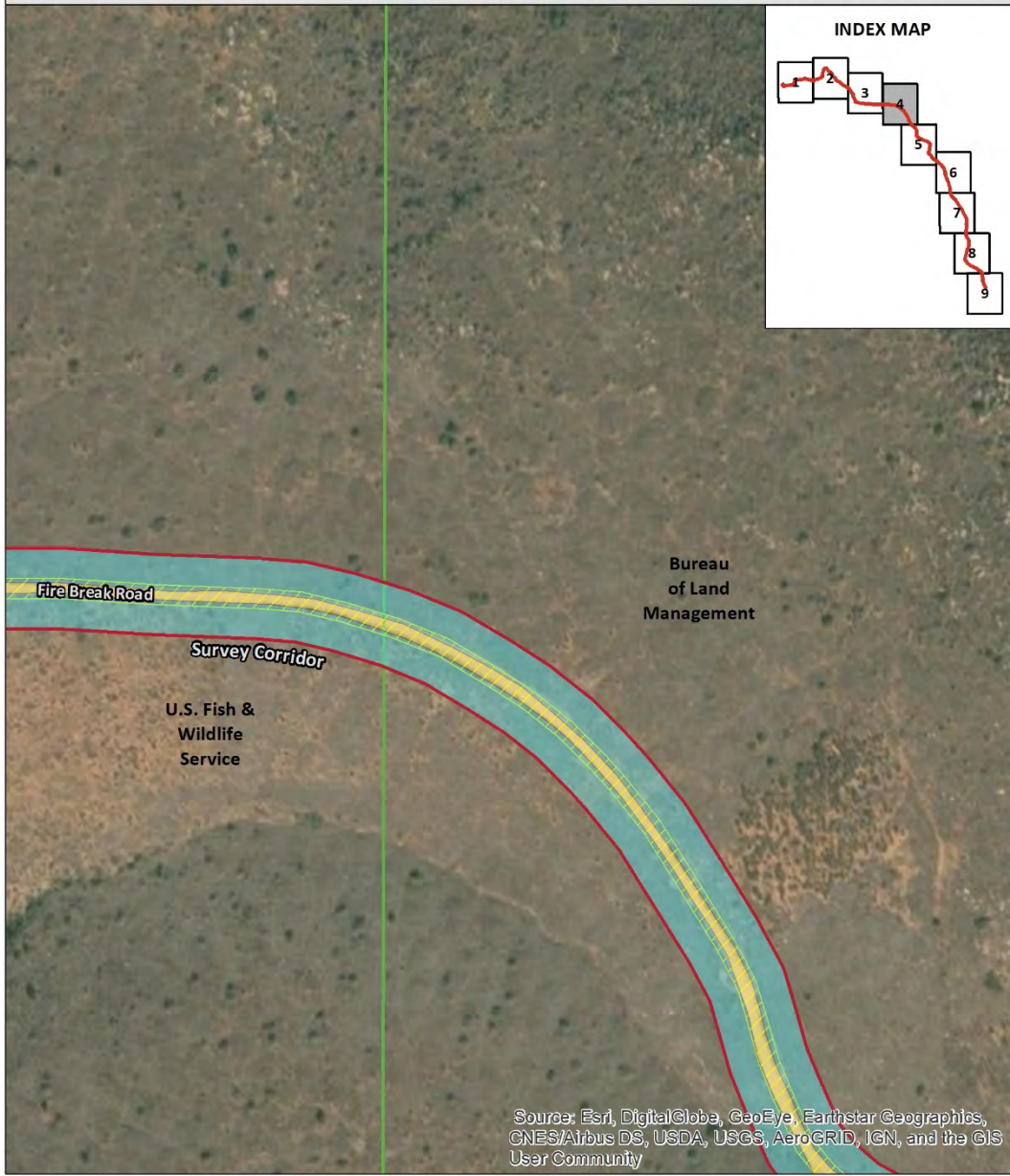
National Vegetation Classification

-  *Adenostema fasciculatum- Xylococcus bicolor- Ceanothus tomentosus* Association (Chamise Chapparral)
-  Mediterranean California Naturalized Annual and Perennial grassland Semi- Natural Stands (Non-Native Grassland/ Coastal Sage Scrub)
-  Disturbed Bare Ground

-  Land Owner
-  Project Area
-  Impact Area



FIRE BREAK ROAD 4

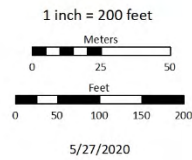


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

National Vegetation Classification

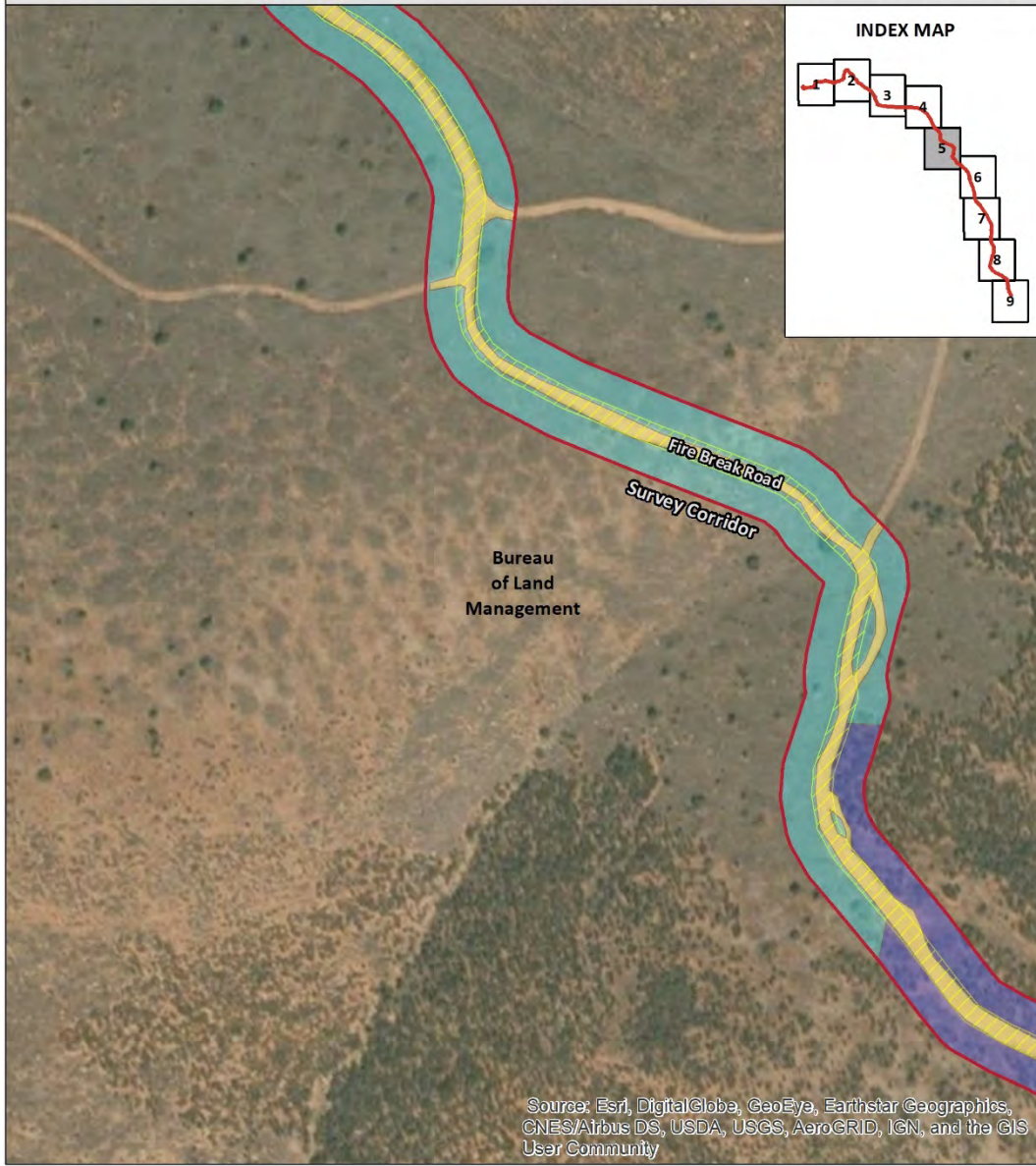
- Mediterranean California Naturalized Annual and Perennial grassland Semi- Natural Stands (Non-Native Grassland/ Coastal Sage Scrub)
- Disturbed Bare Ground

- Land Owner
- Project Area
- Impact Area



5/27/2020

FIRE BREAK ROAD 5

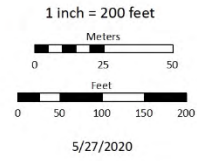


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

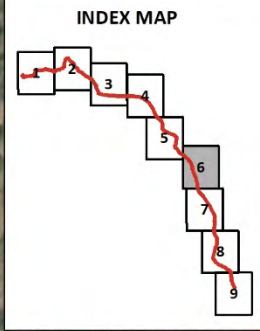
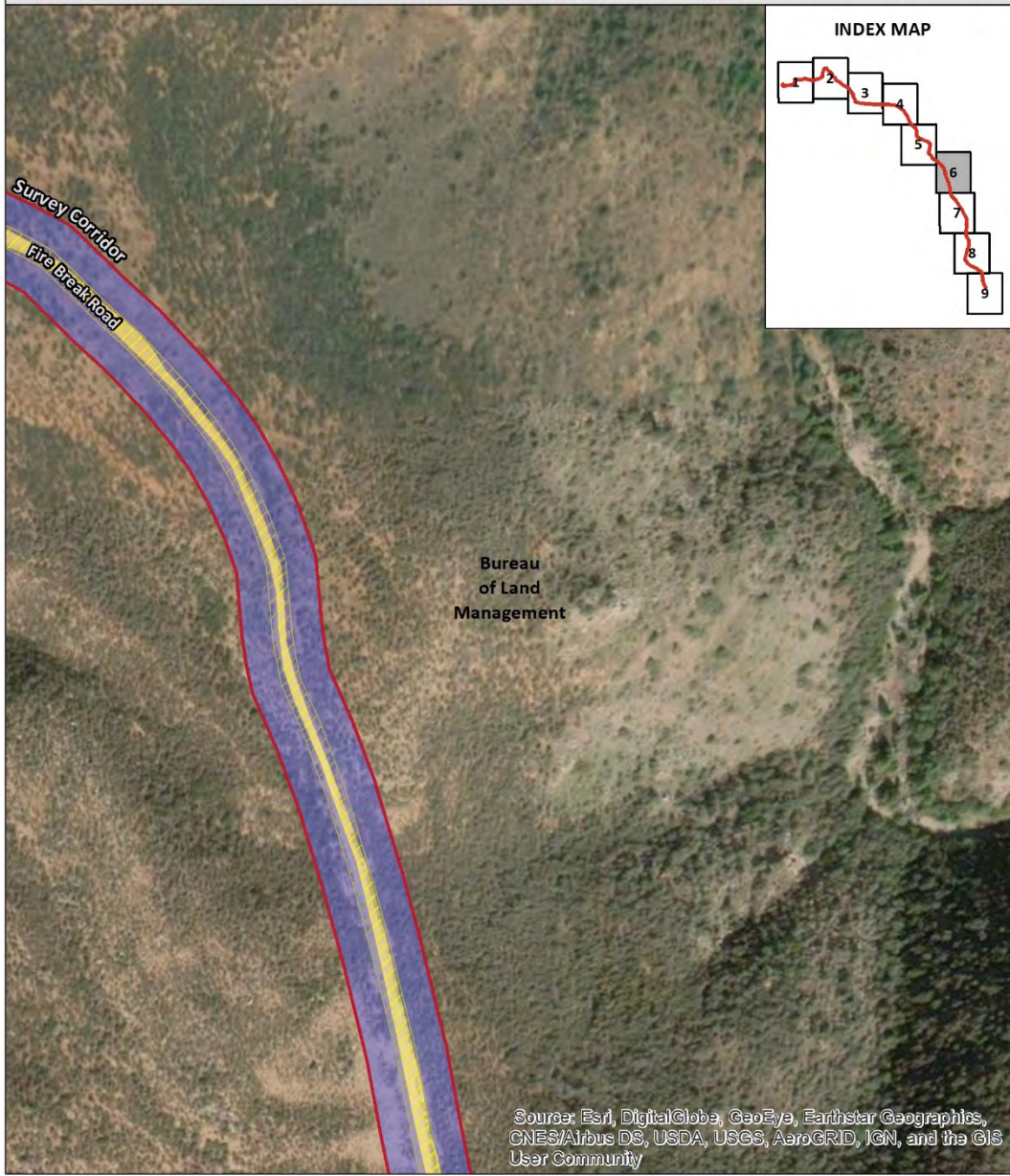
National Vegetation Classification

- Mediterranean California Naturalized Annual and Perennial grassland Semi- Natural Stands (Non-Native Grassland/ Coastal Sage Scrub)
- Adenostema fasciculatum*- *Xylococcus bicolor*- *Ceanothus tomentosus* Association (Chamise Chapparral)
- Disturbed Bare Ground

- Land Owner
- Project Area
- Impact Area





FIRE BREAK ROAD 6

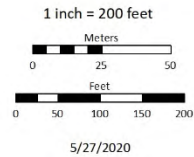


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

National Vegetation Classification

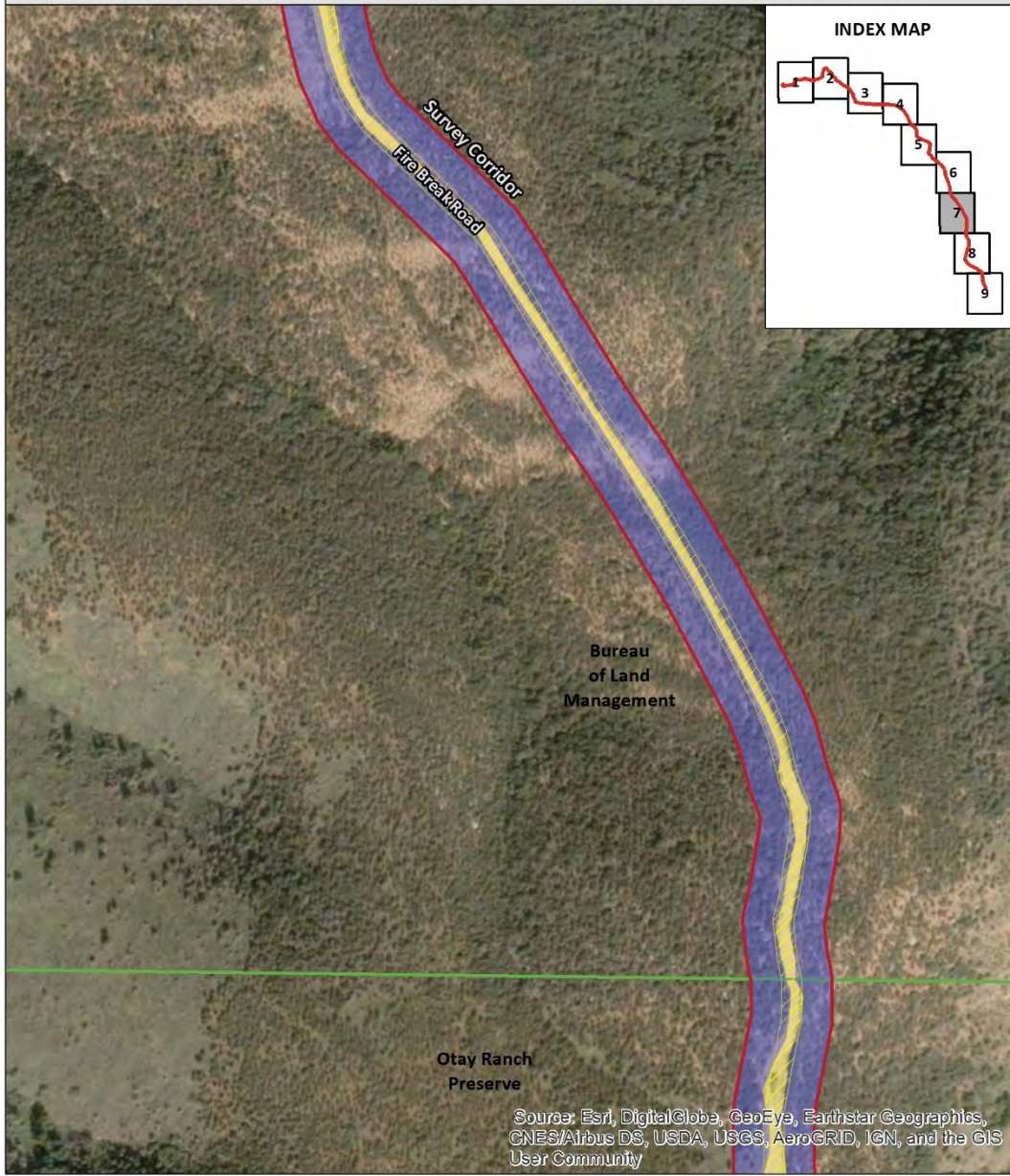
-  *Adenostema fasciculatum- Xylococcus bicolor- Ceanothus tomentosus* Association (Chamise Chapparral)
-  Disturbed Bare Ground

-  Land Owner
-  Project Area
-  Impact Area



5/27/2020

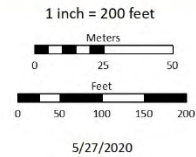
FIRE BREAK ROAD 7



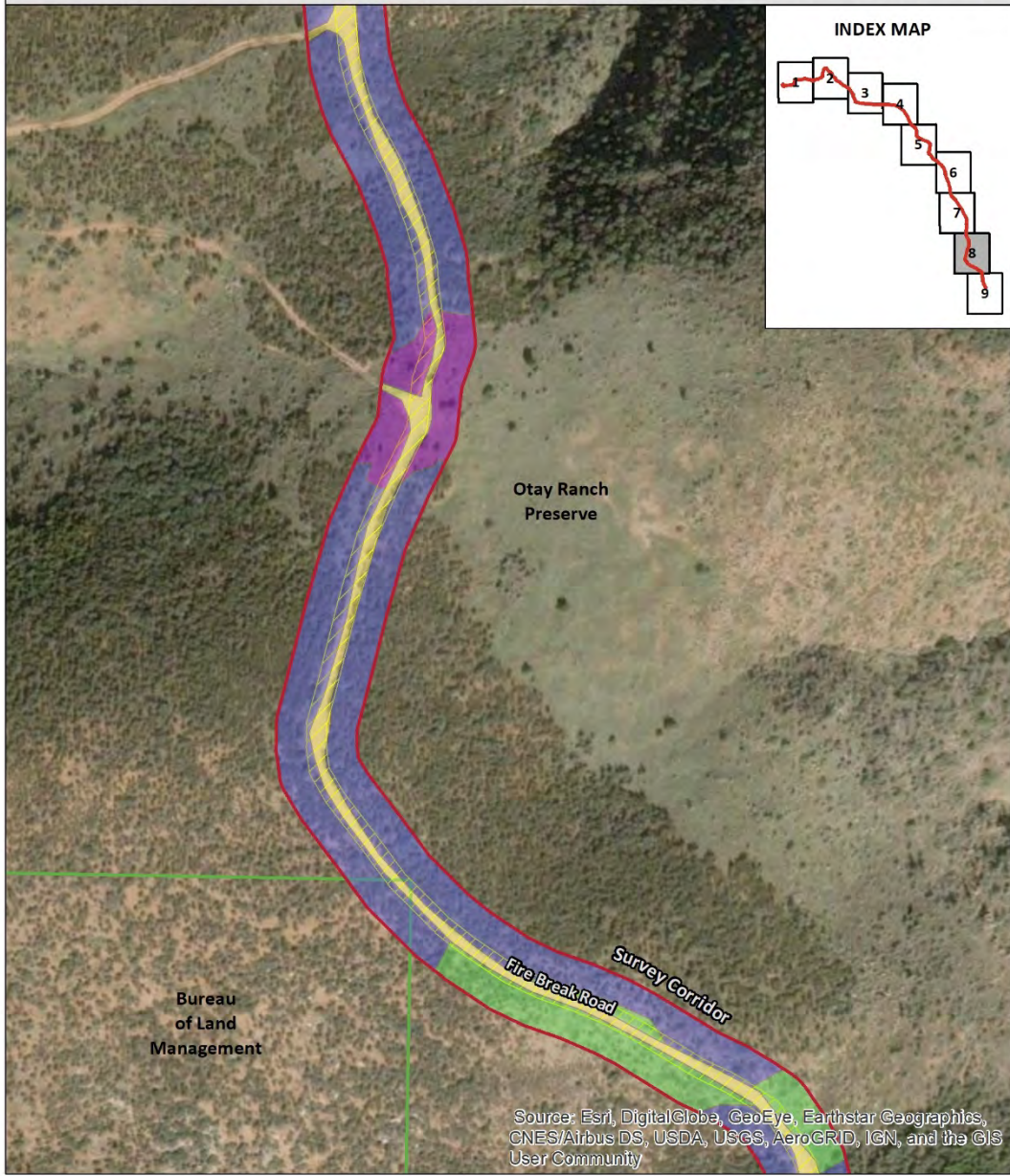
National Vegetation Classification

- Adenostema fasciculatum*- *Xylococcus bicolor*-*Ceanothus tomentosus* Association (Chamise Chapparral)
- Disturbed Bare Ground

- Land Owner
- Project Area
- Impact Area



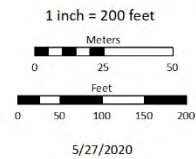
FIRE BREAK ROAD 8



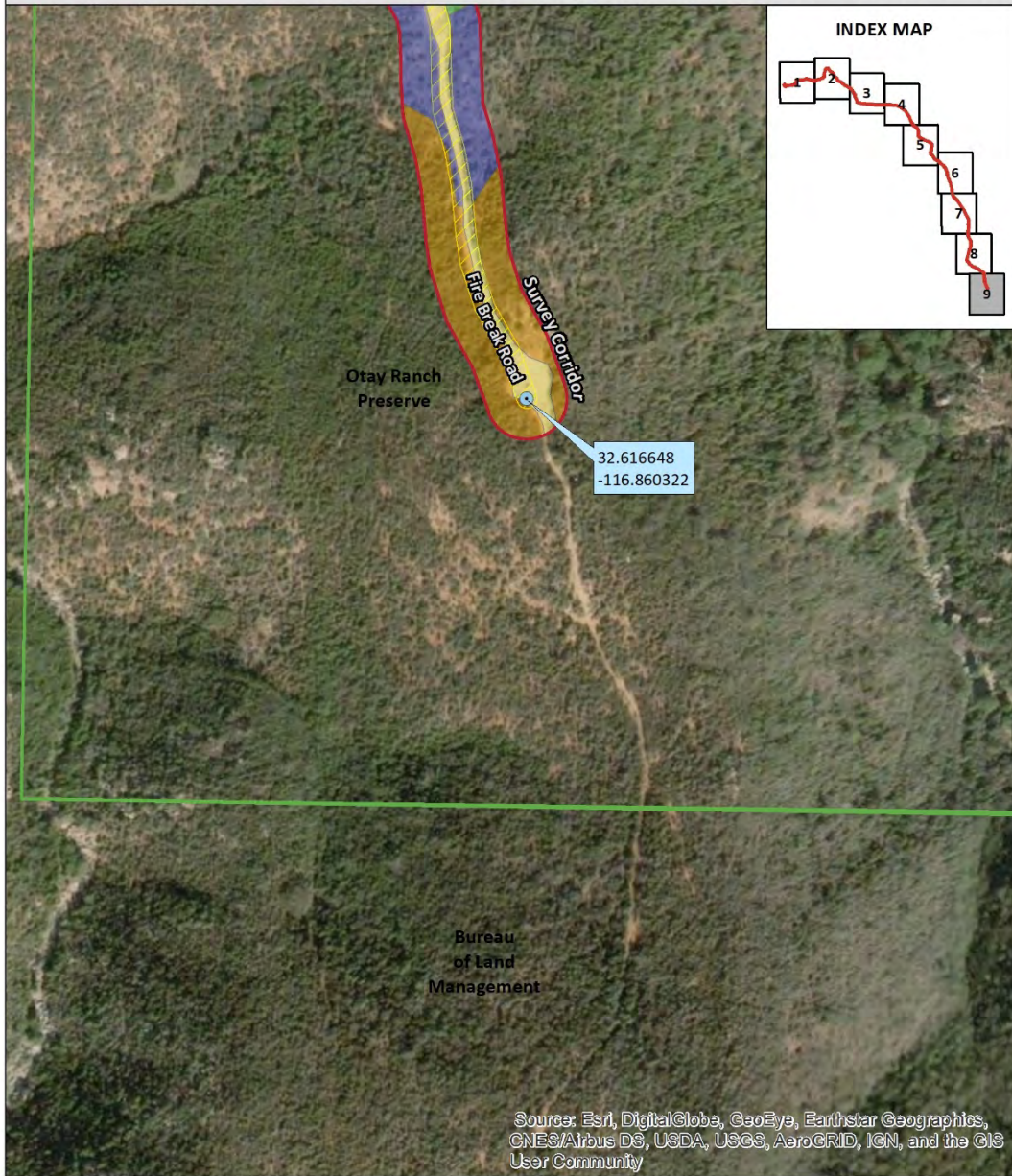
National Vegetation Classification

- Adenostoma fasciculatum*- *Xylococcus bicolor*-
Ceanothus tomentosus Association (Chamise Chaparral)
- Nassella* sp. Association (Native Grassland)
- Bahiopsis lacinata*- *Artemisia californica*-
Eriogonium fasciculatum Association (Coastal Sage Scrub)
- Disturbed Bare Ground

- Land Owner
- Project Area
- Impact Area



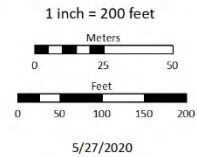
FIRE BREAK ROAD 9



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

National Vegetation Classification

- | | | | |
|---|--|---|--------------|
|  | <i>Adenostoma fasciculatum</i> - <i>Xylococcus bicolor</i> - <i>Ceanothus tomentosus</i> Association (Chamise Chaparral) |  | Land Owner |
|  | <i>Hesperocyparis forbesii</i> Alliance (Southern Interior Cypress Forest) |  | Project Area |
|  | <i>Bahiopsis lacinata</i> - <i>Artemisia californica</i> - <i>Eriogonium fasciculatum</i> Association (Coastal Sage Scrub) |  | Impact Area |
|  | Disturbed Bare Ground | | |



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APPENDIX G

Best Management Practices and Mitigation Measures



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APPENDIX G

Best Management Practices

The Proposed Action has the potential to result in adverse environmental impacts. However, the Proposed Action would be an environmentally acceptable action and overall would not result in major, adverse environmental impacts. If the Proposed Action were implemented, the following best management practices (BMP), measures, design techniques, and mitigation would be carried out by the U.S. Customs and Border Protection (CBP) for the proposed maintenance and repair of 1418 Firebreak Road.

1.1 LAND USE

1. Notify and coordinate with all landowners with property adjacent to the proposed project site in advance of construction activities to discuss the construction schedule and any potential concerns.

1.2 GEOLOGY AND SOILS

1. Implement erosion control measures, including those identified by San Diego County and the San Diego Regional Water Quality Control Board, to prevent movement of soil and sediment and to minimize turbidity increases in water. This includes measures such as installation and maintenance of silt fencing and sediment traps.
2. Implement routine road maintenance practices to avoid making windrows with the soils once grading activities are complete and use any excess soils on site to raise and shape the road surface.
3. Apply water to disturbed soil to reduce dust and re-vegetate disturbed areas as soon as possible following ground disturbance, as appropriate.
4. Plan construction activities and restrict construction traffic to specific areas and routes of travel to minimize soil compaction.
5. Obtain materials such as gravel, topsoil, or fill from sources that are compatible with the proposed project site, are from legally permitted sites, and are certified weed-free. Do not use materials from undisturbed areas adjacent to the proposed project site.

1.3 VEGETATION

1. Limit vehicle refueling and maintenance to upland areas with established spill prevention equipment in place (e.g., straw wattles, lined or paved areas, areas with no direct drains).
2. Maintain stores of chemicals and hazardous materials in proper containers and within spill retention basins large enough to capture and hold the chemicals being housed.
3. Maintain spill clean-up kits and drip pans during construction of the facility.
4. Use flagging or orange fencing to create an avoidance buffer around sensitive plant species or vegetation communities within the disturbance area.

5. Institute environmental awareness training for employees and contractors.
6. Implement a fugitive dust control plan during construction.
7. Follow the CBP protocol for cleaning vehicles and equipment to avoid the spread of invasive species.
8. If irrigation of landscaped vegetation is necessary, restrict it to the landscaped areas and avoid native habitat.
9. Incorporate designs that minimize runoff or use of pesticides.
10. Design artificial topography in disturbance area to take advantage of natural rain runoff, and apply surface materials (e.g., mulch) to retain moisture in the soil.
11. After construction, repair damage to landscaping caused by runoff and replace any dead landscaping plants with similar species. If a particular species dies repeatedly, a more suitable species should be sought.
12. Develop and implement a fire prevention and suppression plan for all activities that require welding or otherwise have a risk of ignition (e.g., use of string trimmers, edgers or chainsaws).
13. Existing roads would be used to access the construction area and no traffic would be allowed outside of those areas.
14. All construction vehicles, equipment, and personally owned vehicles would be parked in the approved disturbance area. Access routes, parking areas, and staging areas would be designated with easily observed removable or biodegradable markers.
15. All contractors and maintenance personnel would operate within the designated and approved disturbance area.
16. CBP would offset a portion of the permanent impacts and all of the temporary impacts on potential Quino checkerspot butterfly habitat by restoring Quino checkerspot butterfly habitat with shrubs and low-density habitat without shrubs.
17. CBP would ensure that development landscaping within 300 feet of on- or off-site habitat to be avoided/preserved does not include exotic plant species that may be invasive to native habitats. Exotic plant species not to be used include any species listed on the Cal-IPC "Invasive Plant Inventory" List. In addition, landscaping should not use plants that require intensive irrigation, fertilizers, or pesticides adjacent to preserve areas and water runoff from landscaped areas should be directed away from the biological conservation easement area and contained and/or treated within the development footprint. CBP would submit a draft list of species to be included in the landscaping to the U.S. Fish and Wildlife Service (USFWS) for approval at least 15 days prior to initiating project impacts. CBP would submit to USFWS the final list of species to be included in the landscaping within 30 days of receiving approval of the draft list of species.
18. If vegetation must be cleared, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or other clearing methods that allow root systems to remain intact.
19. Vegetation targeted for retention would be flagged to reduce the likelihood of being treated.

20. Initial mechanical and chemical vegetation clearing, and subsequent mechanical vegetation control would be timed to avoid the migration, breeding, and nesting timeframe of migratory birds (February 1 through August 31). If initial mechanical and chemical vegetation clearing or subsequent mechanical vegetation control needs to be implemented during February 1 through August 31, a survey for nesting migratory birds would be conducted immediately prior to the start of activities. Clearing of riparian vegetation would be avoided within 100 ft of aquatic habitats to provide a buffer area to protect the habitat from sedimentation.
21. For all in-water work in streams, sediment barriers would be used to avoid downstream effects of turbidity and sedimentation.

1.4 TERRESTRIAL AND AQUATIC WILDLIFE RESOURCES

1. CBP would ensure that the following conditions are implemented during project construction:
 - a. Employees would strictly limit their activities, vehicles, equipment, and construction materials to the disturbance area.
 - b. The proposed project site would be kept as clean of debris as possible. All food related trash items would be enclosed in sealed containers and regularly removed from the site.
 - c. Pets of project personnel would not be allowed in the proposed project site.
 2. Impacts from fugitive dust would be avoided and minimized through watering and other appropriate measures.
 3. Create and implement environmental awareness training for construction workers and personnel.
 4. Implement a 15-mile per hour speed limit on unpaved roads to reduce vehicle-wildlife collisions.
 5. Conduct construction within drainages when water is absent to avoid impacts to aquatic species downstream.
 6. Use flagging or orange fencing to create an avoidance buffer around sensitive plants or wildlife habitat (such as nests or dens) in the disturbance area.
 7. Construction workers and the biological monitors would inspect work areas and equipment for migratory bird nests every day. If a nest is identified, it would be destroyed before it contains eggs. If an active nest containing eggs or chicks is identified, an area of sufficient size would be flagged to create a buffer large enough to avoid direct and indirect effects; no work would occur within that flagged area without further consultation with the USFWS.
 8. If project construction (other than clearing and grubbing of sensitive habitats) occurs during the avian breeding season (March 15 to September 15, or sooner if a qualified biologist demonstrates to the satisfaction of USFWS that all nesting is complete), a qualified biologist would conduct pre-construction surveys in adjacent habitat (up to 500 feet away from the proposed disturbance area) to determine the location of any active
-

bird nests in the area, including raptors and ground nesting birds. The survey should begin not more than three days prior to the beginning of construction activities. USFWS would be notified if any nesting birds are found. During construction, no activity would occur within 300 feet of active nesting territories (500 feet for raptors or listed species), unless measures are implemented to minimize the noise and disturbance to those adjacent birds. Exceptions to this measure includes cases where surveys confirm that adjacent habitat is not occupied or where noise studies confirm that construction noise levels are below 60 dBA hourly Leq along the edge of adjacent habitat. If construction activities are not completed prior to the breeding season and noise levels exceed this threshold, noise barriers would be erected to reduce noise impacts to occupied habitat to below 60 dBA hourly Leq and/or the culpable activities would be suspended.

9. For maintenance of the proposed project site, time vegetation control outside of the breeding season or conduct nesting bird surveys prior to vegetation control or construction between February 1 (January 1 for raptors) and August 31.
10. Point floodlights used for construction and exterior lighting downward to illuminate the necessary areas and install perch deterrents on poles.
11. Implement a fugitive dust control plan during construction (e.g., wetting the ground surface, controlling vehicle access, rerouting).
12. For operations, keep all vehicular activity on existing and proposed roads.
13. CBP would ensure that development lighting adjacent to all on- or off-site habitat would be directed away from and/or shielded so as not to illuminate native habitats. CBP would submit a lighting plan to USFWS prior to initiating project impacts.

1.5 THREATENED AND ENDANGERED SPECIES

1.5.1 Listed Species Measures

There are no federally listed plant, fish, reptile, or mammal species with potential to occur in the Action Area. There are, however, federally listed crustacean, insect, and bird species with the potential to occur in the Action Area. The following general measures will apply to the Proposed Action:

1. All access routes within the Action Area would be marked prior to construction.
2. All activities (including off-road driving and ground disturbing activities) outside of the marked access routes and Action Area will be avoided.
3. A qualified biologist would be present on a full-time basis during construction and maintenance to document the implementation of all BMPs.
4. Clearing and grubbing in suitable habitat of threatened or endangered species would be limited to the minimum necessary to maintain drivable access roads.

1.5.1.1 Least Bell's Vireo

To minimize disturbance to least Bell's vireo, the following measures will apply to work conducted adjacent to riparian habitat:

1. Conduct pre-construction surveys between February 15 and August 15, to determine if least Bell's vireo are nesting within 300 feet of construction activities.
2. If a nest is found, establish either an 8-foot tall plywood sound wall as far from the nest as possible, but no less than 50 feet between construction and the nest, or conduct sound analysis and monitoring to demonstrate that noise does not exceed 60 Db sustained for an hour at the nest site during project activities.

1.5.1.2 Quino Checkerspot Butterfly

The following measures would be implemented to minimize impacts to Quino checkerspot butterflies:

1. A designated biological monitor would be present during all road improvement activities to minimize impacts to Quino checkerspot butterfly and associated larval host plants.
2. For permanent impacts to Quino checkerspot butterfly habitat as a result of the Proposed Action, a mitigation ratio of 2:1 has been proposed to address impacts, through a combination of closure of excess access roads and habitat restoration. CBP has identified five roads in the vicinity of 1418 Firebreak Road on California Department of Fish and Wildlife (CDFW) and USFWS San Diego National Wildlife Refuge (SDNWR) land that may be closed to create Quino checkerspot butterfly habitat, with approval from CDFW and USFWS. A total of 12,675 linear feet are available to meet the 9,770 linear feet required for mitigation. The following tasks are recommended to support road closure activity:
 - a. Survey the roads proposed for closure and map surrounding Quino checkerspot butterfly habitat and erosion conditions.
 - b. Stop access to the roads by constructing a vehicle barrier (barrier should visually fit into the context of the National Wildlife Refuge. The barrier may need to extend as much as 150' either side of the closed road to prevent people going around the barrier) similar to a buck and rail or split rail fence placed at 8 locations (length will vary).
 - c. Prepare a Mitigation Management Plan for the road closure, addressing any erosion issues. Included in the Plan would be a map of treatment area locations and dimensions by type and a full description of treatment types. Current conditions can be mapped into four categories:
 - High quality Quino checkerspot butterfly habitat,

- Native habitat but low quality Quino checkerspot butterfly habitat,
 - Combined native and non-native habitat, and
 - Non-native habitat, i.e. non-native grassland.
- d. Prepare a Mitigation Management Plan, detailing each treatment depending on the habitat quality in the roads:
- High quality Quino checkerspot butterfly habitat would require no actions except for monitoring.
 - Native habitat but low quality Quino checkerspot butterfly habitat would be treated by creating pockets for hill topping opportunities that may involve removing some cover and opening up clearings by removing shrubs.
 - Combined native and non-native habitat would be treated by hand removal of exotics and using the removals to create clearings for hill topping or seeding of host plants and possible planting of flat-topped buckwheat (*Eriogonum fasciculatum*).
 - Non-native habitat would be treated by herbicide or mechanical removal to control non-native species, followed by seeding with host plant species and possible planting of flat-topped buckwheat.
- e. Commence a five-year maintenance and monitoring period after the mitigation is installed to ensure success of treatment, remove any non-native cover, and monitor shrub canopy cover. Maintenance and monitoring would be taken over by land managers after success criteria established in the Plan have been met and not to exceed a specified period.

1.5.1.3 Coastal California Gnatcatcher

The following measures would be implemented to minimize impacts to Coastal California gnatcatchers:

1. Conduct pre-construction nest surveys if construction is between February 15 and August 15, to determine if coastal California gnatcatcher are nesting within 300 feet of construction activities.
2. A designated biological monitor would be present during all road improvement activities to minimize impacts to coastal California gnatcatcher.
3. If a nest is found, established either an 8-foot tall plywood sound wall as far from the nest as possible, but no less than 50 feet between construction and the nest, or conduct sound

analysis and monitoring to demonstrate that noise does not exceed 60 Db sustained for an hour at the nest site during project activities.

4. Avoid impacts to areas of perennial vegetation to the extent practicable. Where vegetation impacts cannot be avoided salvage overstory shrubs and stockpile the top 6 inches of topsoil and any grubbed vegetation stockpiled to assist in revegetation.
5. For permanent impacts to coastal California gnatcatcher habitat as a result of the Proposed Action, a mitigation ration of 2:1 has been proposed to address impacts, achieved through restoration of 0.1-acre of coastal sage scrub habitat within disturbed roadways identified by USFWS.

1.5.1.4 San Diego Fairy Shrimp

The following measures would be implemented to minimize impacts to San Diego fairy shrimp:

1. For impacts to road pools supporting San Diego fairy shrimp as a result of the Proposed Action, a mitigation ration of 3:1 has been proposed given the lack of surrounding vernal pool habitat and the disturbed quality of the road pools.
2. Mitigation will be achieved through vernal pool restoration and enhancement and conservation at Arnie's Point Vernal Pool Restoration Area within Immigration and Naturalization Service (INS) property on Otay Mesa. Mitigation efforts will include:
 - a. Placement of conserved vernal pool and associated watershed habitat into a conservation easement.
 - b. Preparation of a Vernal Pool Enhancement and Monitoring plan for approval by USFWS.

1.5.2 Federal Migratory Bird Treaty Act

To prevent impacts to avian species covered under the Migratory Bird Treaty Act (MBTA), clearing and grubbing should take place in fall and winter to avoid impacts to nesting birds. If work cannot be avoided during the breeding season (February 15 to September 15), one week prior to starting work a biologist would survey for nesting birds and identify any nests. An appropriate buffer for avoidance would be established around any nesting birds until the young have fledged or the nest is no longer being used.

- Eagle and raptor nests - 300-foot buffer,
- Special-status bird species - 100-foot buffer, and
- Migratory birds - 25-foot buffer.

1.5.3 Biological Resource Measures

The following minimization and avoidance measures will be implemented in order to limit the effects of construction on biological resources:

1. The limits of construction will be demarcated with stakes or orange construction fencing to clearly identify areas of disturbance.
2. A designated biological monitor would be present during all activities on or near the Project Area. A separate report should be prepared and submitted to CBP immediately if/when an impact occurs outside of the approved Project limits. The biologist would also submit a final report to CBP within 60 days of Project completion that includes an overlay of impacted areas and other relevant information documenting that authorized impacts were not exceeded and that general compliance with conservation measures was achieved.
3. Existing roads would be used to access the construction area and no traffic would be allowed outside of those areas. All construction vehicles, equipment, and personally owned vehicles would be parked in the approved disturbance area. Access routes, parking areas, and staging areas would be designated with easily observed removable or biodegradable markers.
4. All contractors and maintenance personnel would operate within the designated and approved disturbance area.
5. Use flagging or orange fencing to create an avoidance buffer around sensitive plant species or vegetation communities within the disturbance area.
6. Institute environmental awareness training for employees and contractors. The training would include at a minimum a description of the resource and purpose for its protection, the conservation measures that must be implemented, and environmentally responsible construction practices.
7. Construction speed limits would not exceed 15 mph on unpaved roads (graded with ditches on both sides). Night-time travel speeds would not exceed 15 mph and may be less based on visibility and other safety considerations.
8. Limit vehicle refueling and maintenance to upland areas with established spill prevention equipment in place (e.g., straw wattles, lined or paved areas, areas with no direct drains).
9. Maintain stores of chemicals and hazardous materials in proper containers and within spill retention basins large enough to capture and hold the chemicals being housed.
10. Maintain spill clean-up kits and drip pans during construction of the facility.
11. Implement a fugitive dust control plan during construction.

12. Follow the CBP protocol for cleaning vehicles and equipment to avoid the spread of invasive species.
13. Incorporate designs that minimize runoff or use of pesticides.
14. Design artificial topography in disturbance area to take advantage of natural rain runoff, and apply surface materials (e.g., mulch) to retain moisture in the soil.
15. After construction, repair damage to landscaping caused by runoff and replace any dead landscaping plants with similar species. If a particular species dies repeatedly, a more suitable species should be sought.
16. Develop and implement a fire prevention and suppression plan for all activities that require welding or otherwise have a risk of ignition (e.g., use of string trimmers, edgers or chainsaws).
17. If vegetation must be cleared, allow natural regeneration of native plants by cutting vegetation with hand tools, mowing, trimming, or other clearing methods that allow root systems to remain intact. Vegetation targeted for retention would be flagged to reduce the likelihood of being treated.
18. Within the designated disturbance area, grading or topsoil removal would be limited to areas of necessity and within the limit of grading to provide required ground conditions for construction and maintenance activities. Minimizing the disturbance footprint minimizes impacts and restoration requirements. The top six inches of topsoil would be stockpiled for use in revegetation whenever feasible. Stockpiles would not exceed 3.5 feet in height and if necessary, would be covered with natural materials such as burlap. No plastic is permitted due to the heat's sterilization effect on the topsoil.
19. All areas temporarily impacted by Project improvement and maintenance would be revegetated with native plant species following a USFWS approved restoration plan. Restoration plans and activities would be completed by restoration firms with at least five years of experience in conducting successful comprehensive ecological restoration in southern California.
20. Materials used for construction and on-site erosion control would be biodegradable and free of non-native plant seeds and other non-native plant parts to limit potential for infestation. Some natural materials cannot be fully certified as weed-free, and if used, follow-up monitoring and control to limit establishment of non-native plants would be implemented to prevent introduction. Erosion control blankets and wattles would use biodegradable netting. Borrow areas for fill materials such as rock, gravel, or topsoil would be obtained from existing developed or previously used sources, not from undisturbed areas within or adjacent to the Project Area.

21. To eliminate attracting predators of protected animals, all food-related trash items such as wrappers, cans, bottles, and food scraps would be disposed of in closed containers and removed daily from the Project site.
22. Any night lighting for the construction of the Project would be selectively placed, shielded, and directed away from all native vegetative communities north of the Project footprint and the beach.
23. Waste contaminated with construction materials or from cleaning equipment carrying oils, toxic materials, or other contaminants would be stored in closed containers on-site until removed for disposal. Concrete wash water would not be dumped on the ground but would be collected and moved off-site for disposal. This wash water is toxic to aquatic life.

1.6 HYDROLOGY AND GROUNDWATER

1. Implement low-impact development standards and techniques for stormwater management to ensure that predevelopment hydrology is maintained and prevent a net increase in stormwater runoff.
2. Prepare and comply with the spill prevention plan.
3. Graded earthen roads would be slightly crowned and absent of windrows in the gutter line to avoid ponding and channeling within the road during rain events. Grading with the use of commercial grading equipment would restore an adequate surface.
4. The addition of material to the road would be kept to a minimum.
5. Any associated roadside drainage would be maintained to ensure that runoff is relieved from the road surface quickly and effectively without creating further erosion issues.

1.7 SURFACE WATERS AND WATERS OF THE UNITED STATES

1. Landscaping would use a no- or low-water system (drought tolerant plants) as indicated in the *Border Patrol Station Baseline Design Requirements: U.S. Border Patrol Facility Design Standard*.
2. Vehicle refueling and maintenance would be limited to upland areas with established spill prevention equipment in place (e.g., straw wattles that do not have plastic netting, lined or paved areas, areas with no direct drains).
3. Maintain chemicals and hazardous material storage in proper containers and within spill retention basins large enough to capture and hold the chemicals being housed.
4. Flag or mark potentially jurisdictional waters of the United States (surface waters/drainages) in the vicinity of construction.
5. Prepare a stormwater pollution prevention plan and implement applicable construction and post-construction BMPs, including sediment, erosion, pollution prevention control, and stormwater management measures, and associated plans for conformance with the NPDES Construction General Permit.

6. CBP would comply with all applicable requirements of Section 404/401 of the CWA, and EO 11990.
7. Implement BMPs identified in the *County of San Diego Guidelines for Determining Significance for Surface Water Quality*, and the *County of San Diego BMP Design Manual*, as practicable.
8. CBP would temporarily fence (erosion and sediment control devices) the limits of the proposed disturbance area (including construction staging areas and access routes) to prevent additional habitat impacts and prevent the spread of silt from the construction zone into adjacent habitats to be avoided. Erosion and sediment control devices, including fiber rolls and bonded fiber matrix, would be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement. Fencing would be installed in a manner that does not impact habitats to be avoided. CBP would submit to USFWS for approval, at least 14 days prior to initiating project impacts, the final plans for initial clearing and grubbing of habitat and project construction. These final plans would include photographs that show the fenced limits of impact and all areas (including riparian/wetland or coastal sage scrub) to be impacted or avoided. If work occurs beyond the fenced or demarcated limits of impact, all work would cease until the problem has been remedied to the satisfaction of USFWS. Any habitat impacts that occur beyond the approved fenced would be mitigated at a minimum 5:1 ratio. Temporary construction fencing would be removed upon project completion.
9. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities would occur outside of WoUS within the proposed disturbance area. These activities would be located in previously compacted and disturbed areas to the maximum extent practicable and in such a manner as to prevent any runoff from entering WoUS. Fueling of equipment would take place in areas greater than 100 feet from WoUS. Contractor equipment would be checked for leaks prior to operation and repaired as necessary.

1.8 FLOODPLAINS

1. 1. Implement low impact development standards.

1.9 AIR QUALITY

1. Implement fugitive dust-control measures (e.g., wetting the ground surface, control of vehicle access, rerouting of vehicles).
2. Implement proper and routine maintenance of all vehicles and construction and maintenance equipment such that emissions are within the design standards of all vehicles and equipment prior to and during construction activities.

1.10 NOISE

1. All OSHA requirements would be followed with respect to noise impacts. Ensure all motorized equipment possess properly working mufflers and are kept properly tuned to reduce backfires.

1.11 CULTURAL RESOURCES

1. Prior to the initiation of construction or ground-disturbing activities, all personnel would receive training regarding the appropriate work practices necessary to effectively implement BMPs and comply with applicable environmental laws and regulations, including the potential for inadvertent discoveries. Training shall inform all personnel of the procedures to be followed upon the discovery or suspected discovery of archaeological materials, including human remains and their treatment.
2. A qualified archaeologist would attend preconstruction meetings, as necessary, and monitor all ground-disturbing activities within the proposed project site with a Native American monitor present. The role of the Native American monitor shall be to represent tribal concerns and communicate with the tribal council. The requirements for archaeological monitoring would be noted on the construction plans. The archaeologist's duties would include monitoring, evaluation of any finds, analysis of collected materials, and preparation of a monitoring results report.
3. Approved work areas would be established and construction crews would be instructed to stay within the approved work areas and avoid the disturbance of any culturally sensitive areas identified before or during construction.
4. In the event that cultural resources are discovered, the archaeologist would have the authority to divert or temporarily halt ground disturbance to allow evaluation of potentially significant cultural resources. The archaeologist would immediately notify the Project Manager at the time of the discovery, and the Project Manager would notify the CBP. The archaeologist, in consultation with CBP, would determine the significance of the discovered resources. No work may proceed without the written authorization of CBP. CBP would work with consulting parties to identify locations where activity may continue as well as any restrictions or special requirements that must be adhered to while the post-review discovery is addressed. For significant cultural resources, a Research Design and Data Recovery Program may be carried out. CBP's established standard operating procedures for inadvertent discoveries (*Standard Operating Procedure for Post-Review Discovery of Cultural Materials or Human Remains*) would be adhered to in all cases.
5. In the event that human remains are inadvertently discovered or there are indications that human remains may be present, such as headstones, all ground-disturbing activity would cease immediately. The archaeologist would immediately notify the Project Manager at the time of the discovery, and the Project Manager would notify the CBP. CBP would notify state police within 24 hours of the discovery and follow their directions for securing the site pending examination of a medical examiner/coroner. Law enforcement and the coroner would determine whether or not the discovery constitutes a crime scene.

CBP would coordinate with the state police and the coroner regarding where construction activities can resume. No work may proceed without the written authorization of CBP. CBP would notify the Advisory Council on Historic Preservation, the appropriate SHPO or Tribal Historic Preservation Officer, any impacted Indian Tribe, and any impacted federal agency of the discovery in writing within two business days. After receipt of the medical examiner's findings, CBP shall notify all of the above agencies in writing within two business days. NAGPRA would be followed if the discovery is determined to be of Native American origin. CBP's established standard operating procedures for inadvertent discoveries would be adhered to in all cases.

6. All collected cultural materials would be cataloged and permanently curated with an appropriate institution. All artifacts would be analyzed to identify function and chronology as they relate to the history of the area. Faunal material would be identified as to species. CBP's established standard operating procedures for curation would be adhered to in all cases.
7. An archaeological monitoring results report conforming to Archaeological Resource Management Reports guidelines, describing the results analyses, and conclusions of the monitoring program would be prepared and submitted to CBP following termination of the Proposed Action. Any new cultural resources encountered would be recorded on standard Department of Parks and Recreation forms and submitted to the Southern California Information Center.

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Alternative 1: Partial Road Improvement - Proposed Action

Summary: Improve to FC-2 all-weather road from Otay Lakes Rd to beginning of BLM parcel

Description from EA: Alternative 1 is the Proposed Action. Under this alternative, 1418 Firebreak Road would be improved to a FC-2 level, all-weather roadway for 4,885 feet (ft) from Otay Lakes Road to a point where the road enters the Otay Mountain Wilderness on BLM property. Seven water bars and eight earthen low water crossings with rip rap outfall protection aprons would be installed in locations where washouts occur to allow the agents to drive through the road rather than seek an alternate route during flood events. To meet FC-2 design standards, the road width is required to be 24 ft in locations where that standard is not currently met. In locations where a secondary route has been created due to impassable conditions along the 1418 Firebreak Road, one route would be closed and actively revegetated. To offset impacts to vegetation and special-status species, closure and active revegetation of unnecessary dirt roads used by USBP or other administrative users would occur. All road closures would be in the vicinity of 1418 Firebreak Road.

Bio-Studies assumptions: Northern portion of road from Otay Lakes Rd to BLM Parcel included in below mitigation calculation. 25' wide impact area (12.5' off centerline) included for this alternative. Essentially mirroring veg impact calcs from BSR, but abbreviated as all BLM land is excluded.

Firebreak Road - Vegetation Mitigation	Veg Acreage within Survey Area	Veg Acreage within Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	2.587	0.347	0.347	Tier 3	1.5:1	0.52
Coastal Sage Scrub	3.789	0.478	0.478	Tier 2	2:1	0.96
Disturbed	1.893	1.752	0.000	n/a	n/a	0.00
Non-Native grassland	0.062	0.020	0.020	n/a	0.5:1	0.01
Non-Native Grassland/ Coastal Sage Scrub	3.694	0.519	0.519	Tier 2	2:1	1.04
Total	12.03	3.12	1.36			2.52

Firebreak Road - Quino Checkerspot Butterfly Mitigation	Veg Acreage within Survey Area	Veg Acreage within Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	2.587	0.347	0.347	Tier 3	1.5:1	0.52
Coastal Sage Scrub	3.789	0.478	0.478	Tier 2	2:1	0.96
Disturbed*	1.893	1.752	1.752	Tier 1	2:1**	3.50
Non-Native grassland	0.062	0.020	0.020	n/a	0.5:1	0.01
Non-Native Grassland/ Coastal Sage Scrub	3.694	0.519	0.519	Tier 2	2:1	1.04
Total	12.03	3.12	3.12			6.03

*included in calculations, suitable QCB habitat

**Mitigation at a rate of 2:1 would be achieved by permanent closure and active revegetation of other roads in the vicinity.

Alternative 1 Linear feet (feet)	Mitigation Ratio	Total Linear feet needed for Mitigation
4,885.00	2:1	9,770.00

Mitigation - Road Closure Areas	
Closure Area	Linear Feet
1	275.00
2	3,300.00
3	4,600.00
4	3,000.00
5	1,500.00
Total	12,675.00

Firebreak Road - Fairy Shrimp Mitigation	Road Pool Area Acreage	Road Pool Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied	Acre total
Road pool 0	0.000	9.00	9.00	n/a	0.13	27.00	
Road pool 1	0.004	170.00	170.00	n/a	3:1	510.00	
Road pool 2	0.001	60.00	60.00	n/a	3:1	180.00	
Road pool 3	0.013	560.00	560.00	n/a	3:1	1,680.00	
Total	0.018	799.00	799.00			2,397.00	0.06
Road pool with ESA listed fairy shrimp confirmed							

Firebreak Road - Waters of the U.S. Mitigation^	Waters of U.S. Acres	Waters of U.S. Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied	Acre total
Ephemeral drainage 1	0.048	2,082.53	0.00	n/a	n/a	0.00	
Ephemeral drainage 2 / road pool 12	0.003	140.00	0.00	n/a	n/a	0.00	
Total	0.051	2,222.53	0.00			0.00	0.00

^Both ephemeral drainages are outside this alternative area. No impact to ephemeral drainages with this alternative.

Alternative 2: Complete Road Improvement

Summary: Improve entire road from Otay Lakes Rd to City of Chula Vista property to FC-2 level all-weather road

Description from EA: Under this Alternative, 1418 Firebreak Road would be improved to a FC-2 level, all-weather roadway for the entire 12,983 ft from Otay Lakes Road to a point where the road terminates on the City of Chula Vista property that is surrounded by the Otay Mountain Wilderness area. Eight water bars, 19 earthen low water crossings, and two rip rap crossings would be installed in locations where washouts occur to allow the agents to drive through the road rather than seek alternate routes during flood events. To meet FC-2 design standards, the road width is required to be 24 ft in locations where that standard is not currently met. In locations where a secondary route has been created due to impassable conditions along the 1418 Firebreak Road, one route would be closed and actively revegetated. To offset impacts to vegetation and special-status species, closure and active revegetation of unnecessary dirt roads used by USBP or other administrative users would occur. All road closures would be in the vicinity of 1418 Firebreak Road.

Bio-Studies assumptions: Entire road included in mitigation calculations = 25' wide impact (12.5' off centerline) included for this alternative.

Firebreak Road - Vegetation Mitigation	Veg Acreage within Survey Area	Veg Acreage within Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	11.98	1.44	1.44	Tier 3	1.5:1	2.16
Coastal Sage Scrub	4.38	0.59	0.59	Tier 2	2:1	1.17
Disturbed	4.64	4.32	0.00	n/a	n/a	0.00
Native Grassland	0.36	0.06	0.06	Tier 1	3:1	0.17
Non-Native Grassland	0.06	0.02	0.02	n/a	0.5:1	0.01
Non-Native Grassland/ Coastal Sage Scrub	8.18	1.15	1.15	Tier 2	2:1	2.30
Southern Interior Cypress Forest	0.67	0.08	0.08	Tier 1	3:1	0.23
Total	30.26	7.65	3.33			6.05

Firebreak Road - Quino Checkerspot Butterfly Mitigation	Veg Acreage within Survey Area	Veg Acreage within Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	11.98	1.44	1.44	Tier 3	1.5:1	2.16
Coastal Sage Scrub	4.38	0.59	0.59	Tier 2	2:1	1.17
Disturbed*	4.64	4.32	4.32	Tier 1	2:1**	8.65
Native Grassland	0.36	0.06	0.06	Tier 1	3:1	0.17
Non-Native Grassland	0.06	0.02	0.02	n/a	0.5:1	0.01
Non-Native Grassland/ Coastal Sage Scrub	8.18	1.15	1.15	Tier 2	2:1	2.30
Southern Interior Cypress Forest	0.67	0.08	0.08	Tier 1	3:1	0.23
Total	30.26	7.65	7.65			14.69

*included in calculations, suitable QCB habitat

**Mitigation at a rate of 2:1 would be achieved by permanent closure and active revegetation of other roads in the vicinity.

Alternative 2	Mitigation Ratio	Total Linear feet
Linear feet (feet)		needed for
		Mitigation
12,983.00	2:1	25,966.00

Mitigation - Road Closure Areas	
Closure Area	Linear Feet
1	275.00
2	3,300.00
3	4,600.00
4	3,000.00
5	1,500.00
Total	12,675.00

Firebreak Road - Fairy Shrimp Mitigation	Road Pool Area Acreage	Road Pool Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied	Acre total
Road pool 0	0.000	9.00	9.00	n/a	3:1	27.00	
Road pool 1	0.004	170.00	170.00	n/a	3:1	510.00	
Road pool 2	0.001	60.00	60.00	n/a	3:1	180.00	
Road pool 3	0.013	560.00	560.00	n/a	3:1	1,680.00	
Road pool 4	0.000	13.75	13.75	n/a	3:1	41.25	
Road pool 5	0.000	12.50	12.50	n/a	3:1	37.50	
Road pool 6	0.000	208.00	208.00	n/a	3:1	624.00	
Road pool 7	0.027	1,160.00	1,160.00	n/a	3:1	3,480.00	
Road pool 8	0.007	325.00	325.00	n/a	3:1	975.00	
Road pool 9	0.008	360.00	360.00	n/a	3:1	1,080.00	
Road pool 10	0.000	13.50	13.50	n/a	3:1	40.50	
Road pool 11	0.003	144.38	144.38	n/a	3:1	433.14	
Road pool 12 (Ephemeral drainage 2)***	0.003	140.00	140.00	n/a	3:1	420.00	
Road pool 13	0.001	31.50	31.50	n/a	3:1	94.50	
Road pool 14	0.001	40.00	40.00	n/a	3:1	120.00	
Road pool 15****	0.00	0.00	0.00	n/a	3:1	0.00	
Road pool 16****	0.00	0.00	0.00	n/a	3:1	0.00	
Road pool 17****	0.00	0.00	0.00	n/a	3:1	0.00	
Total	0.070	3,247.63	3,247.63			9,742.89	0.22

Road pools with ESA listed fairy shrimp confirmed

***also included with Waters of U.S. mitigation

****Incomplete survey due to suspension of right of entry

Firebreak Road - Waters of the U.S. Mitigation	Waters of U.S. Acres	Waters of U.S. Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied	Acre total
Ephemeral drainage 1	0.048	2,082.53	2,082.53	n/a	3:1	6,247.60	
Ephemeral drainage 2 / road pool 12	0.003	140.00	140.00	n/a	3:1	420.00	
Total	0.051	2,222.53	2,222.53			6,667.60	0.15

Alternative 3: Improve Drainage Features Without Widening Road

Summary: Maintenance and repair of road with installation of drainage control features from Otay Lakes Rd to beginning of BLM parcel

Description from EA: Under this alternative, CBP would maintain and repair the current two-track road and install new drainage control features but without widening the driving surface. Activity would generally be confined to the existing width of the road (8-10 feet wide) from Otay Lakes Road to the BLM parcel for 4,885 feet. Seven water bars and eight earthen low water crossings with rip rap outfall protection aprons would be installed in locations where washouts occur to allow the agents to drive through the road rather than seek an alternate route during flood events. The outfalls for the water bars and low water crossings would have 3 feet wide by 3 feet long rip rap outfall protection aprons outside the road driving surface to dissipate energy and disperse surface water flows. Two passing zones with very minimal vegetation in the center of the road would be cleared, grubbed, and graded to facilitate passing. The areas measure approximately 2 feet wide by 4 feet long or smaller on average. In locations where a secondary route has been created due to impassable conditions along the 1418 Firebreak Road, one route would be closed and actively revegetated. To offset impacts to vegetation and special-status species, closure and active revegetation of unnecessary dirt roads used by USBP or other administrative users would occur. All road closures would be in the vicinity of 1418 Firebreak Road.

Bio-Studies assumptions: Follow the existing road including a 10 ft width only to BLM parcel.

Firebreak Road - Vegetation Mitigation	Veg Acreage within Survey Area	Veg Acreage within 10-foot Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	11.98	0.02	0.02	Tier 3	1.5:1	0.03
Coastal Sage Scrub	4.38	0.01	0.01	Tier 2	2:1	0.02
Disturbed	4.64	1.11	1.11	n/a	n/a	0.00
Native Grassland	0.36	0.00	0.00	Tier 1	3:1	0.00
Non-Native Grassland	0.06	0.00	0.00	n/a	0.5:1	0.00
Non-Native Grassland/ Coastal Sage Scrub	8.18	0.02	0.02	Tier 2	2:1	0.05
Southern Interior Cypress Forest	0.67	0.00	0.00	Tier 1	3:1	0.00
Total	30.26	1.16	1.16			0.10

Firebreak Road - Quino Checkerspot Butterfly Mitigation	Veg Acreage within Survey Area	Veg Acreage within 10-foot Impacts Limits	Habitat Acreage Considered for Mitigation	MSCP Tier	Mitigation Ratio	Acreage with ratio applied
Chamise Chaparral	11.98	0.02	0.02	Tier 3	1.5:1	0.03
Coastal Sage Scrub	4.38	0.01	0.01	Tier 2	2:1	0.02
Disturbed*	4.64	1.11	1.11	Tier 1	2:1**	2.22
Native Grassland	0.36	0.00	0.00	Tier 1	3:1	0.00
Non-Native Grassland	0.06	0.00	0.00	n/a	0.5:1	0.00
Non-Native Grassland/ Coastal Sage Scrub	8.18	0.02	0.02	Tier 2	2:1	0.05
Southern Interior Cypress Forest	0.67	0.00	0.00	Tier 1	3:1	0.00
Total	30.26	1.16	1.16			2.32

*included in calculations, suitable QCB habitat

**Mitigation at a rate of 2:1 would be achieved by permanent closure and active revegetation of other roads in the vicinity.

Alternative 3 Linear feet (feet)	Mitigation Ratio	Total Linear feet needed for Mitigation
4,885.00	2:1	9,770.00

Mitigation - Road Closure Areas	
Closure Area	Linear Feet
1	275.00
2	3,300.00
3	4,600.00
4	3,000.00
5	1,500.00
Total	12,675.00

Firebreak Road - Road Pool Mitigation	Road Pool Area Acreage	Road Pool Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied	Acre total
Road pool 0	0.000	9.00	9.00	n/a	3:1	27.00	
Road pool 1	0.004	170.00	170.00	n/a	3:1	510.00	
Road pool 2	0.001	60.00	60.00	n/a	3:1	180.00	
Road pool 3	0.013	560.00	560.00	n/a	3:1	1,680.00	
Total	0.018	799.00	799.00			2,397.00	0.06

Road pools with ESA listed fairy shrimp confirmed

*also included with Waters of U.S. mitigation

**Incomplete survey due to revocation of right of entry

Firebreak Road - Waters of the U.S. Mitigation*	Waters of U.S. Acres	Waters of U.S. Area Sq. Ft.	Area Considered for Mitigation (Sq. ft.)	MSCP Tier	Mitigation Ratio	Sq. Ft. with ratio applied
Ephemeral drainage 1	n/a	n/a	0.00	n/a	3:1	0.00
Ephemeral drainage 2 / road pool 12	n/a	n/a	0.00	n/a	3:1	0.00
Total	0.000	0.00	0.00			0.00

*Both ephemeral drainages outside this alternative area. No impact to ephemeral drainages with this alternative.

Alternative 4: No Action Alternative

Description from EA: The No Action Alternative: No improvements, maintenance, or repair would occur. CBP enforcement actions would continue at current levels or diminish over time due to the inaccessibility of the area to CBP agents.

Bio-Studies assumptions: No impacts to vegetation communities, Quino checkerspot butterfly, fairy shrimp, or Waters of the U.S. would result from this alternative

General Note: FC-2 roads typically consist of two 3.6-meter (12 ft) travel lanes at a 4 percent cross-slope. Parallel ditches with a 1-vertical to 3-horizontal (1V:3H) front slope and 1-vertical to 4-horizontal (1V:4H) backslope allow for proper drainage. To achieve this standard, sufficient roadway material would be imported to achieve a minimum 150-millimeter (6-inch) deep, well graded roadbed shaped with a defined crown section.

Alternative 1 Linear feet (feet)	Mitigation Ratio 2:1	Total Linear feet needed for Mitigation 9,770.00
4,885.00		

Mitigation - Road Closure Areas	
Closure Area	Linear Feet
1	275.00
2	3,300.00
3	4,600.00
4	3,000.00
5	1,500.00
Total	12,675.00



Road segments shown in red proposed for closure. Road segments shown in green proposed to remain.

APPENDIX H

Air Quality Emissions Calculations



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APPENDIX H

Air Quality Emissions Calculations

Worksheets in this Workbook:

Summary	Summarizes total emissions by calendar year for 2019 Roadway Construction Project - Firebreak Road
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling construction, paving, and fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
AQCR Tier Report	Summarizes total emissions for the San Diego Intra-state Control Region (AQCR 029) Tier report for 2014, to be used to compare 2019 Construction Project - Firebreak Road, to regional emissions. Comparisons to local thresholds of significance and to General Conformity de minimis thresholds (if applicable) are made in the text.

*Summary
Estimated Emissions for Firebreak Road Alternative 1*

Air Emissions for 2019 Roadway Construction Project - Firebreak Road - Alternative 2

Construction Emissions	NO_x (ton)	VOC (ton)	CO (ton)	SO₂ (ton)	PM₁₀ (ton)	PM_{2.5} (ton)	CO₂ (ton)
Combustion	0.337	0.020	0.136	0.029	0.021	0.020	41.50
Fugitive Dust	-	-	-	-	6.782	0.678	-
Haul Truck On-Road	0.215	0.019	0.071	0.001	0.008	0.008	58.92
Commuter	0.195	0.164	1.966	0.001	0.004	0.004	175.02
TOTAL	0.75	0.20	2.17	0.03	6.82	0.71	275.43

Note: Total PM_{10/2.5} fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO ₂ emissions converted to metric tons =	250 metric tons
State of California's CO ₂ emissions from fuel combustion =	358,600,000 metric tons (DOE 2017)
Percent of California's Fuel Combustion CO ₂ emissions =	0.000%
United States' CO ₂ emissions =	5,166,000,000 metric tons (DOE 2017)
Percent of USA's CO ₂ emissions =	0.0000%

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2017. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide)*. Available online <<http://www.eia.gov/environment/emissions/state/>>. 2017 data values are the most recent. Data accessed 01 December 2019.

Since future year budgets were not readily available, actual 2014 air emissions inventories for the county was used as an approximation of the regional inventory. Because the construction of Firebreak Road is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

San Diego Intrastate Air Quality Control Region (AQCR 029)						
Point and Area Sources Combined						
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO₂ (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)
2014	33,871	118,864	229,143	1,236	32,592	12,488

Source: USEPA National Emissions Inventory (NEI) (<https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>). Site visited

Air Emissions from 2019 Roadway Construction Project - Firebreak Road

Point and Area Sources Combined					
NO_x (tpy)	VOC (tpy)	CO (tpy)	SO₂ (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)
33,871	118,864	229,143	1,236	32,592	12,488
1	0	2	0	7	1
0.0022%	0.0002%	0.0009%	0.0025%	0.0209%	0.0057%

Regional Emissions
Emissions
% of Regional

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO₂, CO, PM_{2.5}, PM₁₀, and CO₂ due to Construction and Demolition

General Construction and Demolition Activities	Area Disturbed	
1.) Firebreak Road - Total paved area	117,240 ft ²	Road construction assumed to be 24 ft by 12,983 ft for full segment of repair. Assuming construction activity would be limited to the final footprint of the road
2.) Firebreak Road - Construction Area	0 ft ²	No general construction
Total Construction Area:	0 ft ² 0.00 acres	
Total Demolition Area:	0 ft ² 0.00 acres	No demolition
Total Pavement Demolition Area:	0 ft ²	No demolition
Total Pavement Area:	0.00 acres 117,240 ft ²	
Total Disturbed Area:	2.69 acres 117,240 ft ² 2.69 acres	
Construction Duration:	12 months	It is likely that a project this size will take at least two years, but we have compressed all activities into a single year to assure a worst-case annual emission estimate.
Annual Construction Activity:	240 days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
 Factors provided are for the weighted average US fleet for CY2007.
 Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	3.45	2.55	2.47	4941.53

Paving

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	3.93	2.78	2.69	5623.96

Demolition

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	2.58	1.92	1.87	3703.07

Building Construction

Equipment ^d	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Req ^a per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

- a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
- c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO₂ emissions by more than a factor of two.
- d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO _x	VOC	CO	SO ₂ **	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	1	41,641	2,577	15,710	3,449	2,546	2,469	4941,526
Paving Equipment	1	45,367	2,606	18,578	3,926	2,776	2,693	5623,957
Demolition Equipment	1	31,808	1,886	12,584	2,585	1,923	1,865	3703,074
Building Construction	1	39,396	3,130	17,382	3,116	2,829	2,744	4464,512
Air Compressor for Architectural Coating	1	3,574	0,373	1,565	0,251	0,309	0,300	359,773
Architectural Coating**			0,000					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NO_x = (Total Grading NO_x per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft ²)	Total Area (acres)	Total Days	
Grading:	117,240	2.69	2	(from "Grading" worksheet)
Paving:	117,240	2.69	13	
Demolition:	0	0.00	0	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	83.28	5.15	31.42	6.90	5.09	4.94	9,883
Paving	589.77	33.87	241.52	51.03	36.09	35.01	73,111
Demolition	-	-	-	-	-	-	0
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	673.06	39.03	272.94	57.93	41.18	39.94	82,994

Results: Total Project Annual Emission Rates

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Total Project Emissions (lbs)	673.06	39.03	272.94	57.93	41.18	39.94	82,994
Total Project Emissions (tons)	0.337	0.020	0.136	0.029	0.021	0.020	41,497

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction and Demolition Activities	0.19 ton	PM ₁₀ /acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42 ton	PM ₁₀ /acre-month	MRI 1996; EPA 2001; EPA 2006

PM_{2.5} Emissions

PM _{2.5} Multiplier	0.10	(10% of PM ₁₀ emissions assumed to be PM _{2.5})	EPA 2001; EPA 2006
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Control Efficiency

0.50	(assume 50% control efficiency for PM ₁₀ and PM _{2.5} emissions)	EPA 2001; EPA 2006
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Project Assumptions

New Roadway Construction (0.42 ton PM₁₀/acre-month)

Duration of Construction Project	12 months (from Project Combustion worksheet)
Area	2.69 acres (from Project Combustion worksheet)

General Construction and Demolition Activities (0.19 ton PM₁₀/acre-month)

Duration of Project	12 months (from Project Combustion worksheet)
Area	0.00 acres (from Project Combustion worksheet)

	Project Emissions (tons/year)			
	PM₁₀ uncontrolled	PM₁₀ controlled	PM_{2.5} uncontrolled	PM_{2.5} controlled
New Roadway Construction	13.565	6.782	1.356	0.678
General Construction Activities	0.000	0.000	0.000	0.000
Total	13.565	6.782	1.356	0.678

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM₁₀/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM₁₀/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM₁₀/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM₁₀/acre-month) and 75% of the average emission factor (0.11 ton PM₁₀/acre-month). The 0.19 ton PM₁₀/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM₁₀/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM₁₀/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM₁₀/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM_{2.5} Multiplier

0.10

PM_{2.5} emissions are estimated by applying a particle size multiplier of 0.10 to PM₁₀ emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM₁₀ and PM_{2.5}

0.50

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999*. EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants*. Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1)*. Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 2.69 acres/yr (from Combustion Worksheet)
 Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions

Terrain is mostly flat.
 An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
 200 hp bulldozers are used for site clearing.
 300 hp bulldozers are used for stripping, excavation, and backfill.
 Vibratory drum rollers are used for compacting.
 Stripping, Excavation, Backfill and Compaction require an average of two passes each.
 Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	2.69	0.34
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.69	1.32
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.35	1.36
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.35	0.56
2315 310 5020	Compaction	Vibrating roller, 6" lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	2.69	0.94
TOTAL								4.51

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 4.51
 Qty Equipment: 3.00
 Grading days/yr: 1.50

Haul Truck Emissions

Emissions from hauling paving and excavated material are estimated in this spreadsheet.

Emission Estimation Method: AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Oct. 2014.

Fill and Excavation Materials Assumptions:

Haul trucks carry 20 cubic yards of soil per trip, but averaging in trucks carrying redi-mix concrete and other construction supplies, assume 10 cubic yards per truck. The average distance from the project site to Baltimore or northern DC metro area is 20 miles; therefore, a haul truck will travel 40 miles round trip. Estimated number of trips required by haul trucks = total amount of material/10 cubic yards per truck. This alternative includes an acre of trees that will likely need to be removed, including the heavy roots that must be removed so that they do not decompose and open voids beneath the pavement. If all the trees were mature trees, it would take about 50 trees to cover an acre. Therefore, 25 additional truck loads have been added to the standard truck trip calculation to account for hauling away the green waste.

Amount of Materials for Other Structures/Equipment =	0 cubic yards	Assume cubic yards of materials for other structures is based on the area of disturbance plus the area of demolition listed on Project Combustion tab, times 3 feet deep.
Amount of Excavation Material for Paving =	4,342 cubic yards	Paving area from Project Combustion tab, multiplied by depth of disturbance which is assumed to be 1 foot.
Amount of Paving Materials =	4,342 cubic yards	Paving area from Project Combustion tab, multiplied by 1 foot deep.
Number of trucks required =	893 heavy duty diesel haul truck trips.	calculated from the cubic yards above, plus 25 trips for an acre of trees.
Miles per round trip =	40 miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
HDDV	5.447	0.488	1.814	0.013	0.215	0.198	1495.6

Notes:

Emission factors for all pollutants are from Table 5-23 - On-Road Vehicle Emission Factors – 2018 - Maryland AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Jul 2016.

HDDV Haul Truck Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	429.15	38.45	142.92	1.02	16.94	15.60	117833.90
tons	0.215	0.019	0.071	0.001	0.008	0.008	58.917

Any paving requires some sort of compacted uniform base. Assume that native soil will not do, so you will have to import about 6" of base. The thickness of the paving itself will range from 2 1/2" for a sidewalk or residential driveway, to 4" for a street or parking lot that carries trucks, to 6" for state/interstate highway that carries heavy trucks, to 1'-3' for runways and aprons that carry heavy aircraft. Note that any of these dimensions may double, depending upon local soil stability and expected unusual loads.

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors are from the AFCEC Air Emissions Guide for Air Force Mobile Sources, July 2016.

Assumptions:

Light Duty Gasoline Truck (LDGT) vehicle emission factors for scenario year 2018 are used.
 The average roundtrip commute for a construction worker = 30 miles
 Number of construction days = 240 days (from Project Combustion worksheet)
 Number of construction workers (daily) = 50 people

On-Road Vehicle (LDGT) Emission Factors for Year 2018 (grams/mile)

NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
0.492	0.413	4.954	0.003	0.011	0.010	441

Emission factors for all pollutants are from Table 5-23 - On-Road Vehicle Emission Factors – 2018 - Maryland AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Jul 2016.

Construction Commuter Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	390.5	327.8	3932	2.38	8.73	7.94	350036
tons	0.195	0.164	1.966	0.001	0.004	0.004	175.02

Example						
	0.492 g NO _x /mi		30 miles roundtrip		50 workers	240 days/yr
				=	390.5	lb NO _x /yr

Worksheets in this Workbook:

Summary	Summarizes total emissions by calendar year for 2019 Roadway Construction Project - Firebreak Road
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling construction, paving, and fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
AQCR Tier Report	Summarizes total emissions for the San Diego Intrastate Control Region (AQCR 029) Tier report for 2011, to be used to compare 2019 Construction Project - Firebreak Road, to regional emissions. Comparisons to local thresholds of significance and to General Conformity de minimis thresholds (if applicable) are made in the text.

Air Emissions for 2019 Roadway Construction Project - Firebreak Road - Alternatives 2 and 3

Construction Emissions	NO_x (ton)	VOC (ton)	CO (ton)	SO₂ (ton)	PM₁₀ (ton)	PM_{2.5} (ton)	CO₂ (ton)
Combustion	0.877	0.051	0.357	0.076	0.054	0.052	108.30
Fugitive Dust	-	-	-	-	18.026	1.803	-
Haul Truck On-Road	0.560	0.050	0.187	0.001	0.022	0.020	153.85
Commuter	0.195	0.164	1.966	0.001	0.004	0.004	175.02
TOTAL	1.63	0.26	2.51	0.08	18.11	1.88	437.17

Note: Total PM_{10/2.5} fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO ₂ emissions converted to metric tons =	397 metric tons
State of California's CO ₂ emissions from fuel combustion =	358,600,000 metric tons (DOE 2017)
Percent of California's Fuel Combustion CO ₂ emissions =	0.000%
United States' CO ₂ emissions =	5,166,000,000 metric tons (DOE 2017)
Percent of USA's CO ₂ emissions =	0.00001%

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2017. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide)*. Available online <<http://www.eia.gov/environment/emissions/state/>>. 2017 data values are the most recent. Data accessed 01 December 2019.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the construction of Firebreak Road is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Metropolitan Baltimore Intrastate Air Quality Control Region (AQCR 115)

Year	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
2011	73,437	77,712	316,599	25,410	27,416	11,061

Source: USEPA National Emissions Inventory (NEI) (<http://www.epa.gov/ttn/chief/net/2011inventory.html>). Site visited on 21 October 2015.

Air Emissions from 2019 Roadway Construction Project - Firebreak Road

	Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Regional Emissions	73,437	77,712	316,599	25,410	27,416	11,061
Emissions	2	0	3	0	18	2
% of Regional	0.0022%	0.0003%	0.0008%	0.0003%	0.0660%	0.0170%

Regional Emissions
Emissions
% of Regional

*Summary
Estimated Emissions for Firebreak Road Alternatives 2 and 3*

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO₂, CO, PM_{2.5}, PM₁₀, and CO₂ due to Construction and Demolition

General Construction and Demolition Activities	Area Disturbed	
1.) Firebreak Road - Total paved area	311,592 ft ²	Road construction assumed to be 24 ft by 12,983 ft for full segment of repair. Assuming construction activity would be limited to the final footprint of the road
2.) Firebreak Road - Construction Area	0 ft ²	No general construction
Total Construction Area:	0 ft ² 0.00 acres	
Total Demolition Area:	0 ft ² 0.00 acres	No demolition
Total Pavement Demolition Area:	0 ft ²	No demolition
Total Pavement Area:	0.00 acres 311,592 ft ²	
Total Disturbed Area:	7.15 acres 311,592 ft ² 7.15 acres	
Construction Duration:	12 months	It is likely that a project this size will take at least two years, but we have compressed all activities into a single year to assure a worst-case annual emission estimate.
Annual Construction Activity:	240 days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
 Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center
 (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
 Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	3.45	2.55	2.47	4941.53

Paving

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	3.93	2.78	2.69	5623.96

Demolition

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	2.58	1.92	1.87	3703.07

Building Construction

Equipment ^d	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Req ^a per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

- a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
- c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO₂ emissions by more than a factor of two.
- d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO _x	VOC	CO	SO ₂ **	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	1	41,641	2,577	15,710	3,449	2,546	2,469	4941,526
Paving Equipment	1	45,367	2,606	18,578	3,926	2,776	2,693	5623,957
Demolition Equipment	1	31,808	1,886	12,584	2,585	1,923	1,865	3703,074
Building Construction	1	39,396	3,130	17,382	3,116	2,829	2,744	4464,512
Air Compressor for Architectural Coating	1	3,574	0,373	1,565	0,251	0,309	0,300	359,773
Architectural Coating**			0,000					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NO_x = (Total Grading NO_x per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft ²)	Total Area (acres)	Total Days	
Grading:	311,592	7.15	4	(from "Grading" worksheet)
Paving:	311,592	7.15	35	
Demolition:	0	0.00	0	
Building Construction:	0	0.00	0	
Architectural Coating:	0	0.00	0	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	166.56	10.31	62.84	13.80	10.18	9.88	19,766
Paving	1,587.86	91.20	650.25	137.40	97.16	94.25	196,838
Demolition	-	-	-	-	-	-	0
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	1,754.42	101.51	713.08	151.20	107.35	104.13	216,605

Results: Total Project Annual Emission Rates

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Total Project Emissions (lbs)	1,754.42	101.51	713.08	151.20	107.35	104.13	216,605
Total Project Emissions (tons)	0.877	0.051	0.357	0.076	0.054	0.052	108,302

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction and Demolition Activities	0.19 ton	PM ₁₀ /acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42 ton	PM ₁₀ /acre-month	MRI 1996; EPA 2001; EPA 2006

PM_{2.5} Emissions

PM _{2.5} Multiplier	0.10	(10% of PM ₁₀ emissions assumed to be PM _{2.5})	EPA 2001; EPA 2006
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Control Efficiency

0.50	(assume 50% control efficiency for PM ₁₀ and PM _{2.5} emissions)	EPA 2001; EPA 2006
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Project Assumptions

New Roadway Construction (0.42 ton PM₁₀/acre-month)

Duration of Construction Project	12 months	(from Project Combustion worksheet)
Area	7.15 acres	(from Project Combustion worksheet)

General Construction and Demolition Activities (0.19 ton PM₁₀/acre-month)

Duration of Project	12 months	(from Project Combustion worksheet)
Area	0.00 acres	(from Project Combustion worksheet)

	Project Emissions (tons/year)			
	PM₁₀ uncontrolled	PM₁₀ controlled	PM_{2.5} uncontrolled	PM_{2.5} controlled
New Roadway Construction	36.052	18.026	3.605	1.803
General Construction Activities	0.000	0.000	0.000	0.000
Total	36.052	18.026	3.605	1.803

Project Fugitive
Estimated Emissions for Firebreak Road Alternatives 2 and 3

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM₁₀/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM₁₀/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM₁₀/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM₁₀/acre-month) and 75% of the average emission factor (0.11 ton PM₁₀/acre-month). The 0.19 ton PM₁₀/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM₁₀/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM₁₀/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM₁₀/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM_{2.5} Multiplier

0.10

PM_{2.5} emissions are estimated by applying a particle size multiplier of 0.10 to PM₁₀ emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM₁₀ and PM_{2.5}

0.50

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999*. EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants*. Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1)*. Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 7.15 acres/yr (from Combustion Worksheet)
 Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions

Terrain is mostly flat.
 An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
 200 hp bulldozers are used for site clearing.
 300 hp bulldozers are used for stripping, excavation, and backfill.
 Vibratory drum rollers are used for compacting.
 Stripping, Excavation, Backfill and Compaction require an average of two passes each.
 Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	7.15	0.89
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	7.15	3.50
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	3.58	3.61
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	3.58	1.48
2315 310 5020	Compaction	Vibrating roller, 6" lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	7.15	2.51
TOTAL								11.99

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 11.99
 Qty Equipment: 3.00
 Grading days/yr: 4.00

Haul Truck Emissions

Emissions from hauling paving and excavated material are estimated in this spreadsheet.

Emission Estimation Method: AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Oct. 2014.

Fill and Excavation Materials Assumptions:

Haul trucks carry 20 cubic yards of soil per trip, but averaging in trucks carrying redi-mix concrete and other construction supplies, assume 10 cubic yards per truck. The average distance from the project site to Baltimore or northern DC metro area is 20 miles; therefore, a haul truck will travel 40 miles round trip. Estimated number of trips required by haul trucks = total amount of material/10 cubic yards per truck. This alternative includes an acre of trees that will likely need to be removed, including the heavy roots that must be removed so that they do not decompose and open voids beneath the pavement. If all the trees were mature trees, it would take about 50 trees to cover an acre. Therefore, 25 additional truck loads have been added to the standard truck trip calculation to account for hauling away the green waste.

Amount of Materials for Other Structures/Equipment =	0 cubic yards	Assume cubic yards of materials for other structures is based on the area of disturbance plus the area of demolition listed on Project Combustion tab, times 3 feet deep.
Amount of Excavation Material for Paving =	11,540 cubic yards	Paving area from Project Combustion tab, multiplied by depth of disturbance which is assumed to be 1 foot.
Amount of Paving Materials =	11,540 cubic yards	Paving area from Project Combustion tab, multiplied by 1 foot deep.
Number of trucks required =	2333 heavy duty diesel haul truck trips.	calculated from the cubic yards above, plus 25 trips for an acre of trees.
Miles per round trip =	40 miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
HDDV	5.447	0.488	1.814	0.013	0.215	0.198	1495.6

Notes:

Emission factors for all pollutants are from Table 5-23 - On-Road Vehicle Emission Factors – 2018 - Maryland AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Jul 2016.

HDDV Haul Truck Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	1120.66	100.40	373.21	2.67	44.23	40.74	307704.59
tons	0.560	0.050	0.187	0.001	0.022	0.020	153.852

Any paving requires some sort of compacted uniform base. Assume that native soil will not do, so you will have to import about 6" of base. The thickness of the paving itself will range from 2 1/2" for a sidewalk or residential driveway, to 4" for a street or parking lot that carries trucks, to 6" for state/interstate highway that carries heavy trucks, to 1'-3' for runways and aprons that carry heavy aircraft. Note that any of these dimensions may double, depending upon local soil stability and expected unusual loads.

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors are from the AFCEC Air Emissions Guide for Air Force Mobile Sources, July 2016.

Assumptions:

Light Duty Gasoline Truck (LDGT) vehicle emission factors for scenario year 2018 are used.
 The average roundtrip commute for a construction worker = 30 miles
 Number of construction days = 240 days (from Project Combustion worksheet)
 Number of construction workers (daily) = 50 people

On-Road Vehicle (LDGT) Emission Factors for Year 2018 (grams/mile)

NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
0.492	0.413	4.954	0.003	0.011	0.010	441

Emission factors for all pollutants are from Table 5-23 - On-Road Vehicle Emission Factors – 2018 - Maryland AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Jul 2016.

Construction Commuter Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	390.5	327.8	3932	2.38	8.73	7.94	350036
tons	0.195	0.164	1.966	0.001	0.004	0.004	175.02

Example						
	0.492 g NO _x /mi		30 miles roundtrip		50 workers	240 days/yr
				=	390.5	lb NO _x /yr